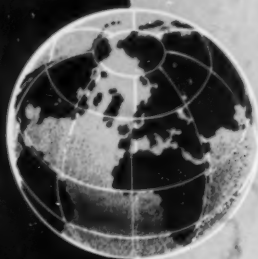


JULY 1956

Vol. 18 No. 8

MINING WORLD



What Law 167 Will Do To
Your Unpatented Claim

Australia's Largest Mine
Treats Lowest Grade Ore



Mi Vida—A Big Mine On Fourth Birthday

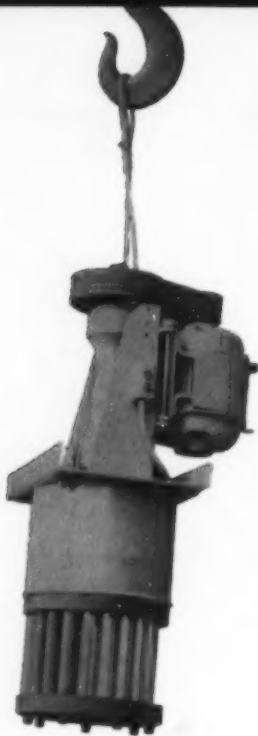
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50 cents a copy—3s 6d in sterling

**ONE
DEAD
CELL**

but this

WEMCO Fagergren
still produces



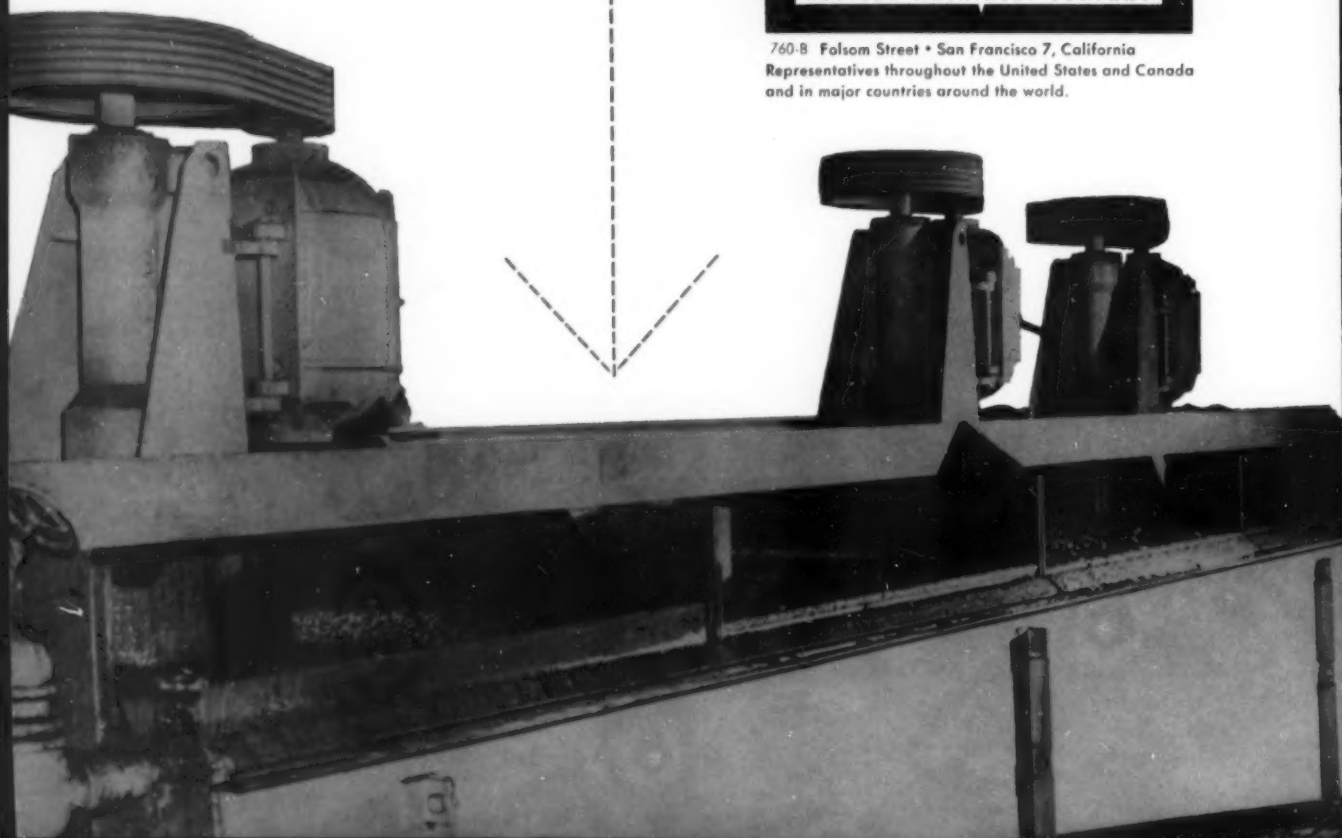
There is no down time when a Wemco Fagergren mechanism is lifted out for service. The bank of cells continues to produce without interruption. Sanding up of the inactive cell is no problem. When the serviced unit (or a spare) is returned, it simply digs its way back into position.

Over half the world's flotation tonnage is produced in Wemco Fagergrens. Operating convenience and easy maintenance are among the reasons both large and small plants choose these machines. High recovery and low reagent consumption are other deciding factors.

For the full facts on how Wemco Fagergren Flotation Machines can *cut your operating costs*, write today for descriptive literature.



760-B Folsom Street • San Francisco 7, California
Representatives throughout the United States and Canada
and in major countries around the world.



On the Mesabi Iron Range



EXTRA-TOUGH going calls for extra-tough AMSCO® DIPPERS...with Renewable Lip

On the Iron Range and in the Copper Mines, demands on dippers are really tough. And that's where Amsco Manganese Steel Dippers have proved they can "take it"...in years of rough use.

Amsco Renewable Lip Dippers are particular favorites here. For when the lip eventually wears out, this easily changed unit cuts "repair-time" to one-tenth that required for change-over of conventional designs.

The lip sides overlap and fit snugly into sockets in the back casting. Lugs on lip fit into slots in front

casting and are secured by forged, split keys. Sturdy U-bolts fasten lip to back casting, pulling it tightly to dipper when double nuts are screwed down. The result is one-piece rigidity and strength, free of play in any direction.

You save two ways: first, through the extra-long service life of Amsco Manganese Steel Dippers; second, through quick and easy replacement of the Renewable Lip.

See your shovel manufacturer for full information on Amsco Dippers, or write us direct.



AMSCO

American Manganese Steel Division • Chicago Heights, Ill.
OTHER PLANTS IN: DENVER, LOS ANGELES, NEW CASTLE, DEL., OAKLAND, CAL., ST. LOUIS, JOLIETTE, QUEBEC

CARSET

JACKBITS

LAST LONGER, DRILL FASTER THAN EVER



*...when you keep them
sharpened, with machine
precision, on the new*

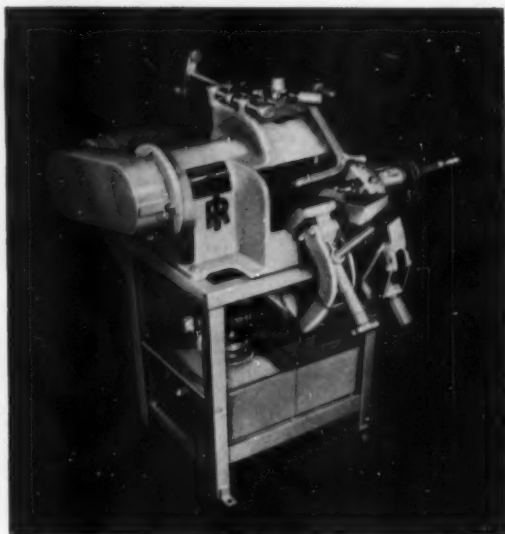
JC-3 JACKBIT GRINDER

A NEW Ingersoll-Rand Carset Jackbit has no equal for sustained high drilling speed and maximum bit life in practically any type of rock.

To maintain this "good as new" performance after resharpening, it's important that the cutting faces be ground without unnecessary waste and to the proper shape. Although hand grinding can be used successfully where the number of bits sharpened per day is limited, higher production calls for a *faster and more precise* method of resharpening.

These requirements are met to excellent advantage with the new JC-3 Jackbit Grinder. All bit surfaces are ground with machine precision to exactly the right shape for maximum drilling efficiency—more quickly, easily and accurately than can be done by hand grinding.

While the JC Grinder has many new and improved features, it has the same basic design that has proved itself in over 20 years of service. All



bearing and wearing surfaces are protected against the entrance of abrasive grits, virtually eliminating bearing maintenance costs. The Jackbit Grinder can be purchased complete with cooling and gauging equipment and electric, air-motor or gasoline-engine drive—or it can be obtained with only that equipment needed for any particular job. To get the *most* out of your Carset Jackbits, ask your I-R representative for complete information on this time-saving, cost-saving Jackbit Grinder.

15-416

FREE WALL CHART: HOW TO GRIND CARSET JACKBITS

Ingersoll-Rand, Rock Drill Dept., 11 Broadway, New York 4

Please send me illustrated wall chart, Form 4121, showing step-by-step instructions for the proper resharpening of Carset Jackbits.

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ADDRESS _____

CITY _____

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GAS ENGINES

Mining World

Including the Export Edition WORLD MINING

Published monthly except in April when publication is semi-monthly

VOLUME 18

JULY 1956

No. 8

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ON THE COVER: Roof Bolting at Utex Exploration Company's Mi Vida mine in Utah's Big Indian district.

PUBLISHING OFFICE: Emmett St., Bristol, Conn.

EDITORIAL AND EXECUTIVE OFFICES

121 Second St., San Francisco 5, Calif., GARfield 1-5887

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BRANCH OFFICES: New York 17-370 Lexington Ave., Murray Hill 3-9295, Chicago 26-1791
Howard, Rogers Park 4-3420, Vancouver, B.C.-402 Pender St. West, MARine 7287.

PUBLISHED BY American Trade Journals, Inc.

Wm. B. Freeman, President

L. K. Smith, Vice President

Miller Freeman, Jr., Sec.-Treas.

STAFF CORRESPONDENTS: Africa—Johannesburg, Union of South Africa; Salisbury, Southern Rhodesia; Asia—Ankara, Turkey; Kuala Lumpur, Federated Malay States; Tavoy, Burma; Karachi, Pakistan; Seoul, Republic of Korea; Tokyo, Japan. Europe—London, England; Vienna, Austria; Stockholm, Sweden; Trondheim, Norway; Paris, France; Redruth, Cornwall. North and Central America—Mexico D. F., Mexico; Vancouver, British Columbia. South America—Sao Paulo, Brazil; La Paz, Bolivia; Lima, Peru; Bernal, Argentina. Oceania—Port Kembla, N. S. W., Australia; Manila, Philippine Islands. Not responsible for unsolicited manuscripts.

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Mining World Subscription Rates

U. S. North, South and Central America \$3.00
Other Countries \$4.00
Single Copies \$.50
Directory Number \$1.00

WORLD MINING is published the 26th of each month as a regular department of MINING WORLD and is also circulated as a separate publication on a carefully controlled free basis to a selected list of management and supervisory personnel associated with active mining enterprises throughout the world.



MILLER FREEMAN PUBLICATIONS



MINING WORLD, July, 1956. Volume 18, No. 8. Published monthly, except April, when publication is semi-monthly at Emmett St., Bristol, Conn. Executive, advertising and editorial offices, 121 Second St., San Francisco 5, California. Subscription in United States, North, Central, and South America, \$3.00 per year; other countries, \$4.00 per year. Entered as second class matter Oct. 10, 1951 at the Post Office at Bristol, Conn., under the act of March 3, 1879. Postmaster: please send notice 3579 to MINING WORLD, 121 Second St., San Francisco 5, Calif.

GRAB SAMPLES From the Mail

New Lime Schedule Important

Dear Sir:

The new lime schedule for AEC ore buying stations at Moab and Monticello, Utah, described in your June issue, page 75, is a revision that has long been overdue with the installation of alkaline circuits in mills on the Plateau.

Had this new schedule been in effect in the 12-month period to the end of February 1956, it would have represented an increase of 5.7 percent in gross return from our ore sales.

The new schedule does not affect the size of our main ore body, but it may allow us to exploit a few small outlying ore bodies with high-lime content.

We feel that further schedule revision is needed, particularly in view of the installation of alkaline circuits in mills that make the lime penalty for acid circuits obsolete. We feel the producer should be paid for his vanadium and no lime penalty applied.

We further believe that the following improvement should be made in ore buying procedures: incorporate the development allowance into the price paid for uranium in order to 1) stimulate search for and development of prospects because of the higher unit price, and 2) simplify the accounting of operating mines.

CHARLES A. STEEN

President

Utex Exploration Company, Inc.
Moab, Utah

Articles and Ads Useful

Dear Sir:

WORLD MINING is received by us regularly and we find it most useful both in its articles and advertising.

KEITH HOITON

Industrial Agencies (Bolivia) Ltda.
Oruro, Bolivia

Excellent Work of Reference

Dear Sir:

I would like to congratulate WORLD MINING on being so valuable a contribution to the world of mining, and would like particularly to say that I find the annual Yearbook Catalog, Survey, and Directory issue an excellent work of reference.

Rio Tinto Company is carrying out an intense program of highly skilled exploration in South Africa by means of a prospecting company under the direction of the well-known geophysicist, Mr. Oscar Weiss. His chief geologist and manager of the prospecting company, Dr. J. W. N. Sharpe, has expressed himself to me as being particularly interested in WORLD MINING and wishes to read it regularly.

G. B. O. PENN

Director (British)

Rio Tinto Company S.A. (Pty.) Ltd.
Johannesburg, Union of South Africa

The One He Reads from Cover to Cover

Dear Sir:

I would like to inform you that I enjoy and appreciate my copy of WORLD MINING very much. It has contributed considerably to widening my own field of knowledge, and it is the one mining magazine that I read from cover to cover.

D. DE N. WHID, Geologist

O'okiep Copper Company, Ltd.
Nababeep, Cape Province
South Africa



Intense heat no problem for Super Belts

This hydraulic press at Hackney Iron and Steel Co., Enid, Oklahoma, shapes red hot steel plate into tank heads.

The flat leather belt formerly used on this type of press, would stretch, slip, and come off. Tightening the belts only overloaded the bearings. For this press, a Gates Super Vulco Rope drive was chosen because it withstands the near-by intense heat, and its extra horsepower capacity permits lighter weight sheaves; thereby reducing load on bearings.

Claude King, maintenance superintendent, reports: "This Gates V-belt drive has operated 8 hours a day for 5 years without lost time due to maintenance."

Super Belts on vibrator last 7 times longer

James Gann, general superintendent of John B. LaGarde, Inc., Anniston, Alabama, reports:

"Practically every condition exists to shorten V-belt life on the vibrator drive of this concrete block machine. The machine starts and stops 4 times a minute. Intense vibration must be absorbed by the V-belts to protect motor and bearings. Sand and concrete, oil and grease all get into the drive.

"With Gates Super Vulco Ropes, we get about 7 times the average life we received from any other make. It is hard to believe that belts can take this punishment, but Gates Super Vulco Ropes do it."

Solve tough drive problems with this super tough V-belt

If present V-belts are wearing out too fast... if heavy shock loads... oil and heat... or other conditions are causing too frequent replacement... here's the answer:

Gates Super Vulco Rope—the oil and heat resistant V-belt with 40% more horsepower capacity. Easily handles heavy shock loads.

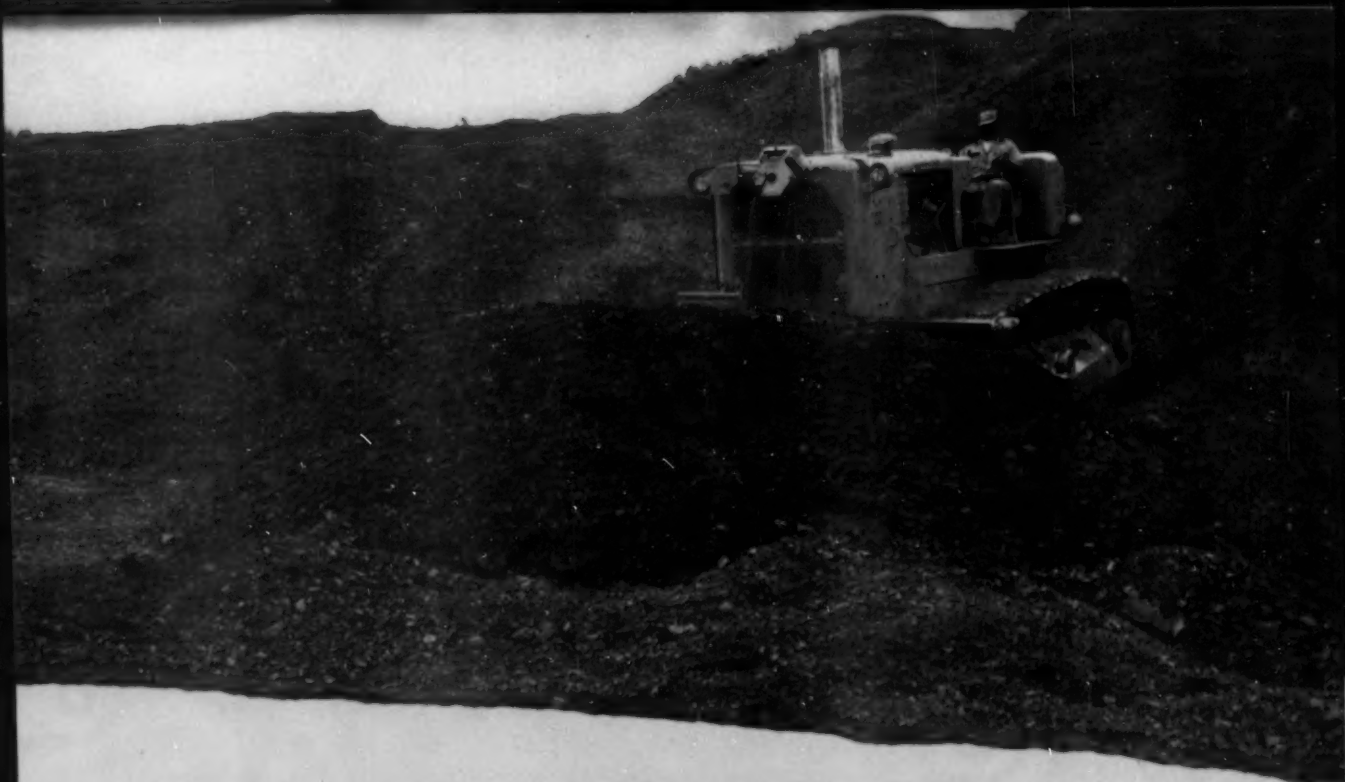
That means longer V-belt life and *cost savings two ways*—savings on belt replacements and savings on maintenance down-time.

Let a Gates V-Belt specialist help you solve *any* tough drive problem. He'll make recommendations without obligation. Gates offices and distributor stocks are listed in the phone book yellow pages in all major industrial centers. The Gates Rubber Co., Denver, Colorado—*World's Largest Makers of V-Belts.*



TPA 104

Gates SUPER VULCO ROPE Drives



NEW D9 TRACTOR

Moves more than 600 cubic yards of shale per hour!

This big new CAT® D9 Tractor 'dozes over 600 yds. per hour over a 100-ft. push. Its No. 9A blade handles 12 to 15 yds., trench-dozing on a 30% favorable grade. Material is shale base course for a haul road at Monsanto Chemical Co.'s Soda Springs, Idaho, phosphate mine.

Like all Cat-built equipment, the new D9s are engineered to do more work with less down time at low cost. Morrison-Knudsen Company, Inc., owns this and other giant Turbocharged 236 HP D9s here, purchased because of previous experience with Caterpillar equipment. The company also has Caterpillar D8 Tractors on this job.

The D9s are working in the phosphate beds of southern Idaho, largest known deposit in the world. The giant yellow "Kings of the Crawlers" strip overburden, which varies from 6 ft. to 10 ft. in depth, and feed ore to the shovel. These great new yellow machines are the product of many thousands of hours' testing on proving grounds and actual construction and mining jobs.

The D9 is tough and traditionally Caterpillar from its completely new, 4-cycle engine with Turbocharger to its "water quench" hardened track shoes. It's available with direct drive or torque converter for speeds to 7.8 MPH. Operators report it fast and easy to handle, with hydraulically boosted steering and brakes, "in-seat" starting, and smooth "live shaft" drive for cable controls.

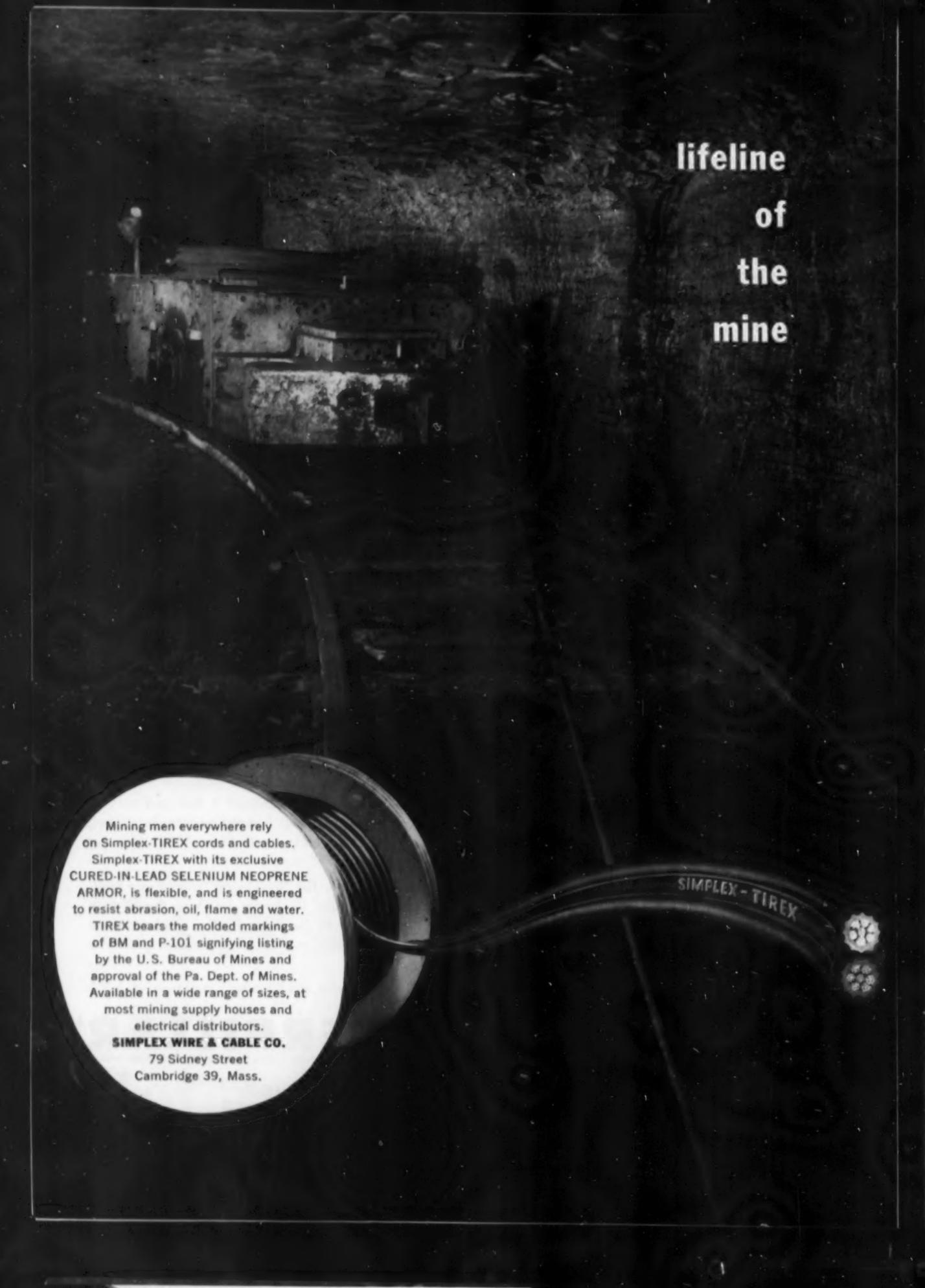
It all adds up to the "workingest" tractor ever built. See your Caterpillar Dealer for details on the D9 with No. 9A or No. 9S Bulldozer blades. And count on him for fast, skilled service and Caterpillar parts you can trust.

Caterpillar Tractor Co., San Francisco, Cal.; Peoria, Ill., U.S.A.

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WILL DEMONSTRATE**



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mine

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ARMOR, is flexible, and is engineered
to resist abrasion, oil, flame and water.

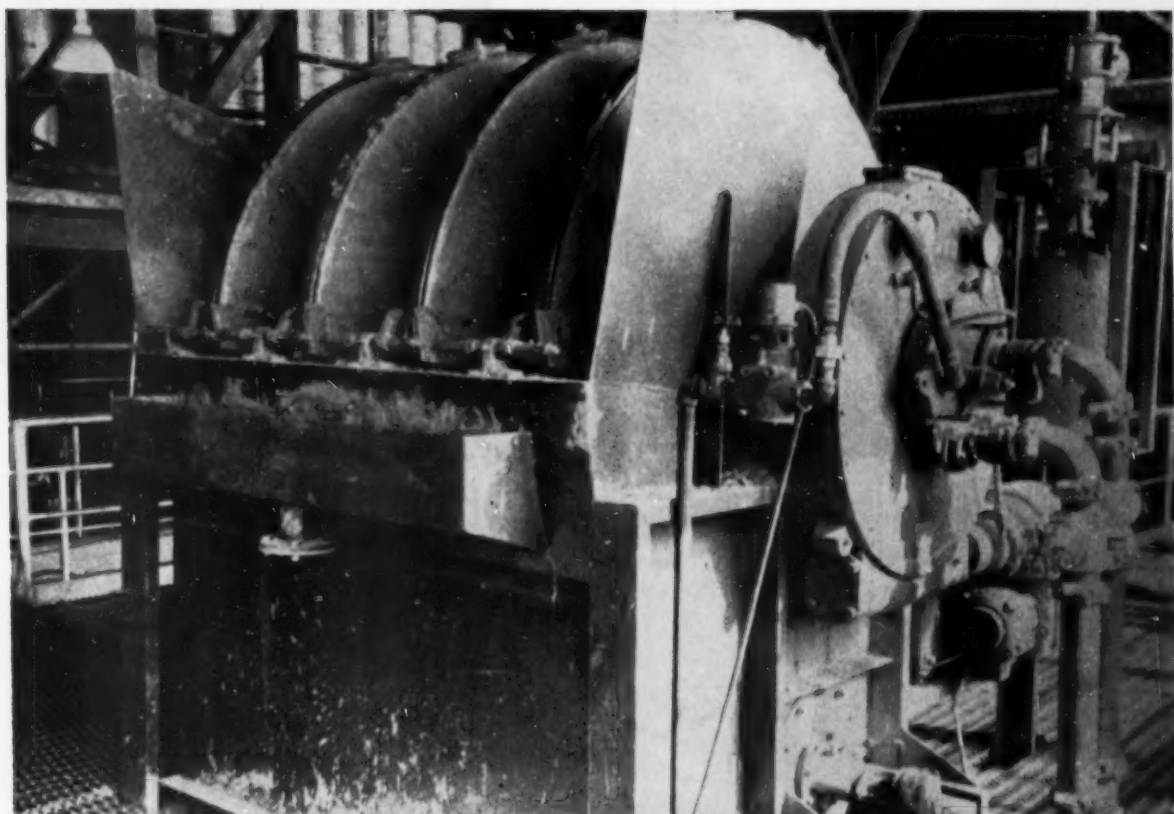
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approval of the Pa. Dept. of Mines.
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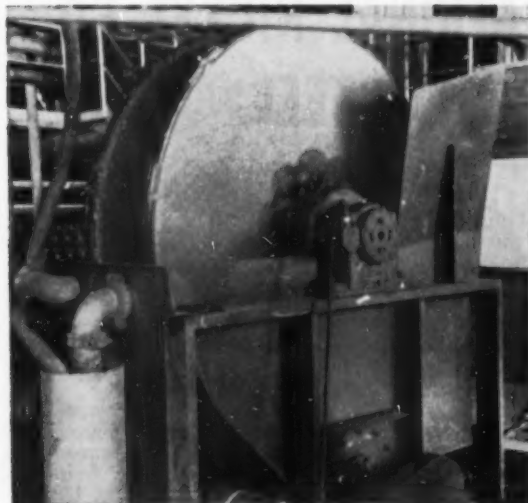
SIMPLEX-TIREX





Eimco Agidisc on zinc circuit. Note the smooth cake of uniform thickness. Note the absence of buildup at the scraper blade and bag clamps.

LOW MOISTURE AT HIGH ALTITUDES WITH EIMCO AGIDISC FILTERS



Eimco two disc Agidisc type used on copper and lead circuits.

Metallurgical concentrates being dewatered in a mill at approximately 9,000 ft. elevation are handled on three Eimco Agidisc filters, one each for lead, copper and zinc circuits.

The ore is ground to 50%—200 mesh and dewatered on the Agidiscs equipped with snap blow device to provide maximum cloth life and tonnage.

Most important is the moisture content of these dewatered concentrates discharged from the filters at this altitude. The monthly average runs; lead 8.0%, copper 9.5% and zinc 10.3%.

Operation of these filters is best expressed in the words of the Superintendent of the mill who says, "their (Eimco Agidiscs) operation is so trouble-free that we have paid no attention to them and feel that when we get time from the other parts of the circuit we will undoubtedly be able to improve the present moistures."

Your problem in dewatering a metallurgical concentrate can be solved by Eimco's filtration engineers. Call on Eimco for the experience and facilities to solve your problem.

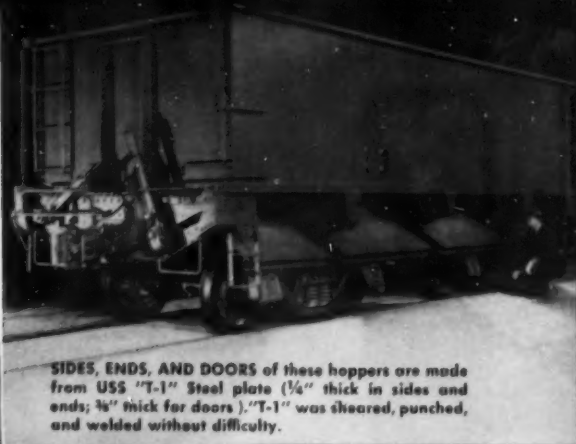
THE EIMCO CORPORATION

Salt Lake City, Utah—U.S.A.

Export Offices: Eimco Bldg., 52 South St., New York City

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SIDES, ENDS, AND DOORS of these hoppers are made from USS "T-1" Steel plate (1/4" thick in sides and ends; 3/8" thick for doors). "T-1" was sheared, punched, and welded without difficulty.



60 ORE CARS FOR INTERNATIONAL NICKEL CO. BUILT WITH USS "T-1" STEEL

Unique 3-way superiority of "T-1" Steel dictated choice

Copper and nickel ores are extremely hard and abrasive. Nevertheless, ore cars must last a long time. They must withstand severe corrosion, tremendous impact and abuse, day after day, for years. In the cold belt of northern Ontario, they must stay tough and durable, be able to take tremendous abuse, even at sub-zero temperatures.

The one steel that fills *all* these requirements, at the lowest cost for top performance, is USS "T-1" Steel. So International Nickel Company of Canada specified USS "T-1" for 60 new ore cars, built by Canadian Car

and Foundry Company, Limited, for use in the largest nickel mining operations in the world, in the Sudbury District, Ontario.

In these cars, USS "T-1" Steel, which has a yield strength of 90,000 psi, plus amazing ability to withstand impact at low temperatures, is expected to increase service life substantially over cars made of carbon steel. Its far greater strength and toughness and ability to withstand abrasion should materially reduce maintenance and the need for part replacement. Result: more continuous operation and lower costs.

WHERE CAN YOU USE USS "T-1"?

Look around *your* operation. If you are in the mining business, or if you're in the business of building equipment for mines, USS "T-1" has a place. In many mines today, USS "T-1" is lengthening service life, reducing weight and cost, simplifying fabrication, increasing capacity of rugged mining equipment. It can do the same for you. Write for details. Or wire, or phone. United States Steel, Room 5338, Pittsburgh 30, Pa.

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TENNESSEE COAL & IRON DIVISION, FAIRFIELD, ALA. • UNITED STATES STEEL SUPPLY DIVISION, WAREHOUSE DISTRIBUTORS, COAST-TO-COAST
UNITED STATES STEEL EXPORT COMPANY, NEW YORK

USS **"T-1"** CONSTRUCTIONAL ALLOY STEEL



UNITED STATES STEEL



Eimco 630 Tractor-Excavator is air powered for tunnel operation.

EIMCO 630 EXCAVATORS SPEED DEVELOPMENT

High speed development can be maintained underground with only the normal shift crew. The Eimco 630 helps the miner or contractor realize this goal because it operates faster and requires no track.

The Eimco 630 Excavator is mounted on the Eimco 630 air or electric (A.C.) powered tractor and the combination unit provides the operator with a really mobile and versatile loading machine.

With its independently controlled tracks the Eimco 630 Excavator can dig in at the toe of the muck pile, bulldoze out into stations cut along the side, walk over, around and through unworkable areas in the mine eliminating the necessity for laying rails.

It is also in use for shaft sinking in round and rectangular shafts. It is being used on slopes and for mucking out sub-level ore pockets.

In all of the applications where the 630 has been employed the costs of handling the material have been less than with previously used equipment.

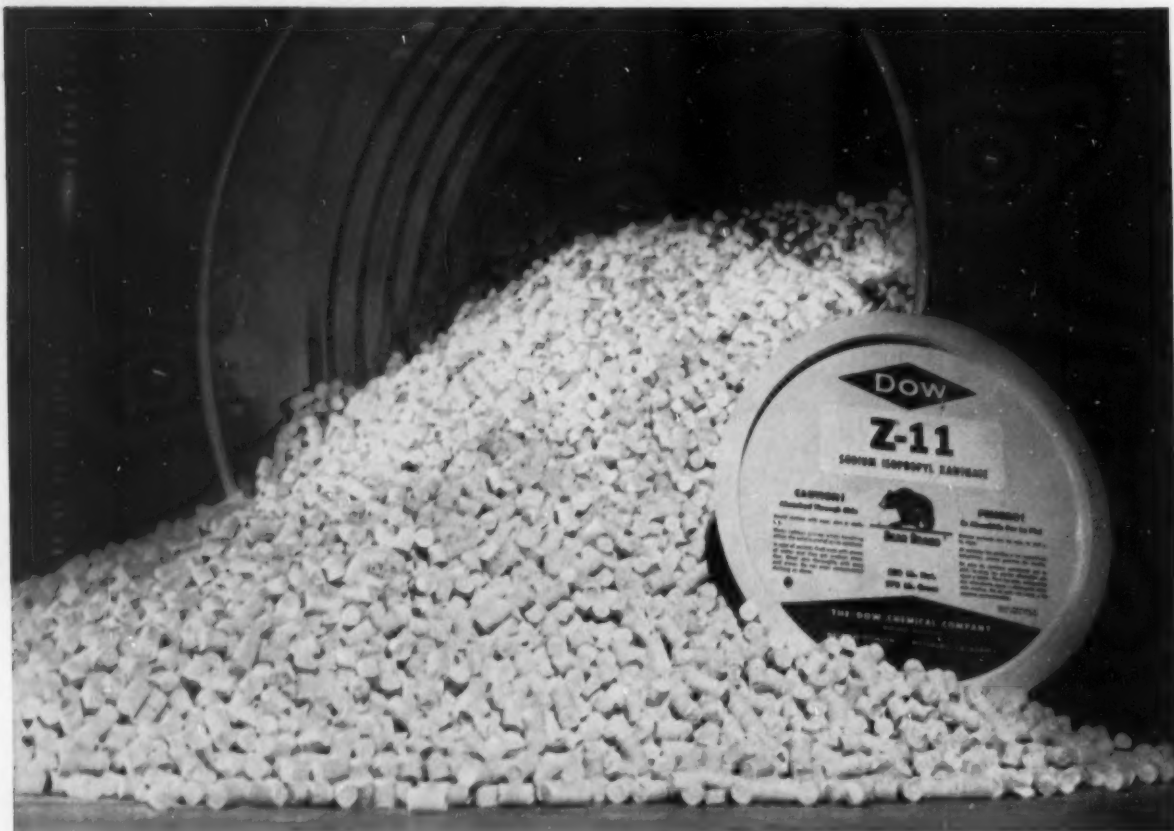
The Eimco 630 is rugged, requires a minimum of maintenance attention and has the same dependability that has been characteristic in Eimco made equipment for more than half a century.

Write for complete information.

THE EIMCO CORPORATION
Salt Lake City, Utah—U.S.A. • Export Offices: Eimco Bldg., 52 South St., New York City

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complete loading of collecting bubbles

Available as pellets that dissolve readily and completely in water, Dow Xanthates assure handling ease, as well as economy. Flotation mills the world over are increasing recovery and improving concentrate grade.

By using one Dow Xanthate or a combination, the metallurgist easily tailors his collector to suit the sulfide minerals to be floated. Bubbles collect faster, sustain maximum loads. And as ore conditions change, Xanthate feed can be adjusted quickly.

These reliable Xanthates are true collectors—substantially nonfrothing. They bring greater operating control of frother and collector, provide extreme selectivity, are readily available from Dow. Other Dow products that help cut recovery costs include Separan 2610®, a new flocculant that speeds settling and filtration operations; and Dowfroth® 250, a hard-working frother for both sulfide and nonsulfide minerals. For test samples and complete data write THE DOW CHEMICAL COMPANY, Midland, Michigan, Dept. OC857N.

you can depend on DOW CHEMICALS





Eimco 105 Tractor-Excavators equipped with 1½ yard rock buckets dig, load and carry material to discharge point (approx. 100 feet). Production on this job estimated at approximately 300 yards per hour per machine.

SPEED, VERSATILITY AND DEPENDABILITY WITH EIMCO 105 TRACTOR-EXCAVATORS

Eimco 105 Tractor-Excavators, shown above, dig and load more rock at less cost per yard than any other earthmoving machine.

These Eimco Excavators are multi-purpose machines. They are easily and quickly moved from one spot to another where work is needed. They are used as prime movers, on production excavation and loading jobs, for bulldozing and other work around the plant.

In production work, the Eimco 105 Tractor-Excavator will load in rock at the rate of 5-6 yards per minute and in easier materials such as sand and gravel, the 105 will load as much as 8-9 yards per minute.

Eimco 105's do a better job than the conventional tractor mounted machine because of Eimco's exclusive operating features. Independent track operation increases the effectiveness of the machine in speed of maneuverability, saves travel time and wear and tear on track assemblies, chains and all crawler parts.

The Eimco power shift saves wear and tear on operators, keeps them fresh and alert all day long. Operator position up front makes it possible to see what is being done.

All cast-alloy steel parts are standard equipment on Eimcos at

no extra cost. Torque converters, also standard, provide better engine operating flexibility and protect the engine from shock.

Eimco 105's are different in construction, design and operation. They are the only really modern tractors in production today. An Eimco engineer will be glad to tell you about the 105 and answer your questions. When you need a Tractor or Tractor-Excavator be sure to see an Eimco 105 at work, and talk to people using them. You are invited to compare the Eimco 105 Tractor, piece for piece with the tractor you are using or any other tractor.

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Salt Lake City, Utah—U.S.A. • Export Offices: Eimco Bldg., 52 South St., New York City

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8-207

more yards per load



more loads per hour

Gets More

A combination of powerful "pry-out" action using breakout pads as a fulcrum for leverage and a 40° bucket tip-back at ground level gets BIGGER LOADS with less spillage.

Keeps More

Heaped loads are cradled closer and lower for greater stability while carrying. Exclusive load shock-absorber also cushions load, smooths the ride, and permits faster movement with less spillage.

Delivers More

Since you get MORE to begin with and keep MORE while traveling at higher speeds . . . with less spillage in both instances . . . the result—you deliver more yards per load and more loads per hour.

Whether you want to move fine manganese ore like this, or larger-size ore and rock, "PAYLOADER" tractor-shovels are designed to get and hold bigger loads and deliver them faster.

"PAYLOADER" superiority on materials handling at mine, mill and smelter is the result of 34 years of pioneering and leadership in tractor-shovel manufacture. "PAYLOADER" preference in the mining industry also comes from the fact that "PAYLOADER" is a complete proven line—a size and type to best meet each need—PLUS the finest parts and service facilities at the nearby "PAYLOADER" Distributor.



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THE FRANK G. HOUGH CO. LIBERTYVILLE, ILL.
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THE FRANK G. HOUGH CO.
859 Sunnyside Ave., Libertyville, Ill.

Send data on "PAYLOADER" Tractor-shovels

- ☐ 4 wheel drive types to 2 1/4 cu. yd.
- ☐ rear wheel drive types to 1 1/2 cu. yd.
- ☐ front wheel drive types to 1 cu. yd.

Name

Title

Company

Street

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it dissolves instantly!

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Without exception users of WESTVACO Soda Ash have been highly pleased with its physical properties and chemical purity. If you use soda ash anywhere in the area bounded roughly by the Mississippi Valley, the Panhandle and the Pacific, you should be using WESTVACO Soda Ash.

We'd like to help you do just that.



ORDINARY SODA ASH

WESTVACO SODA ASH



Westvaco Chlor-Alkali Division FOOD MACHINERY AND CHEMICAL CORPORATION

161 E. 42nd St., New York 17 • Chicago St. Louis Denver Philadelphia So. Charleston, W. Va.

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All-round Dirt-Moving Team

for low-cost operation



**LARGE ENOUGH to get access road jobs done fast —
SMALL ENOUGH for profitable use on low-yardage jobs**

HD-11 crawler—75 drawbar hp. Gets more work done faster and at lower cost with these on-the-job advantages: shock-absorbing, all-steel, box-A main frame; rugged final drives that ride on straddle-mounted roller bearings; 1,000-hour lubrication intervals for truck wheels, idlers and support rollers; ceramic-lined master clutch that requires fewer adjustments, provides extra long life; plus new operator convenience that includes a big foam rubber seat and 24-volt direct electric starting.

AC-106 scraper—6.1 yd struck, 7.5 yd heaped. Plenty of features for fast, low-cost dirt moving: curved, offset cutting edge and "center-boiling"

loading action; wide, low bowl to keep center of gravity low; high-flotation tires and ample ground clearance; maximum stability for working on slopes or rough terrain; 81-in. apron opening and forward-forced ejection for quick, clean dumping; easy adjustments; simple sheave system.

• • •

See these and other important earth-moving advantages of Allis-Chalmers crawler tractor and scraper combinations at your Allis-Chalmers construction machinery dealer. He has complete facilities to serve you—factory-trained servicemen, factory-approved methods and complete stocks of True Original Parts.

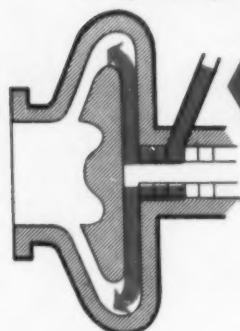
ALLIS-CHALMERS, CONSTRUCTION MACHINERY DIVISION, MILWAUKEE 1, WISCONSIN

ALLIS-CHALMERS



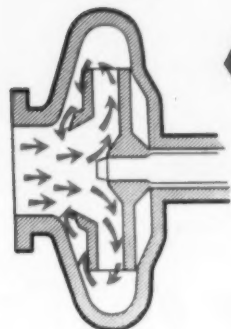
VACSEAL PUMP

**designed to meet rigid requirements
in pumping abrasives and corrosives.**



Flow of sealing water

When dilution of material is an objectionable or prohibitive factor in pumping operations, VACSEAL is the answer to the problem. Vacuum seal is accomplished by a unique (patented) impeller — with pumping blades on one side and large diameter auxiliary vanes on the reverse side that produce a partial vacuum on the shaft and packing. The result is virtually a glandless pump that requires no sealing water to prevent shaft wear and leakage. This VACSEAL feature eliminates cost of plumbing, storage tank and pump to handle fresh water supply.



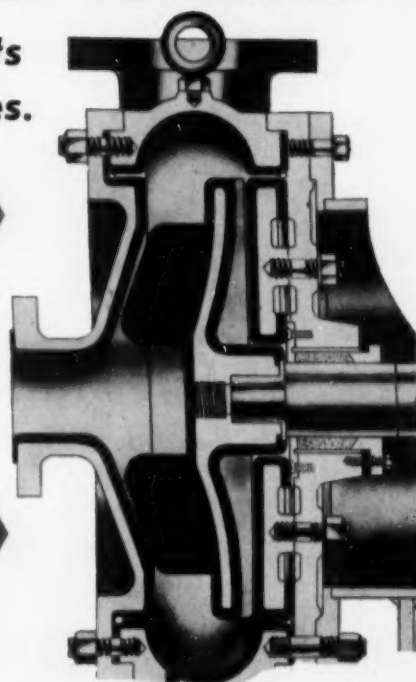
Closed vs open impeller

The modern trend in handling solids is toward the use of open impellers. Thus, there is no surface to be sealed between impeller and suction cover. This eliminates undesirable "double-pumping" that often results from wear caused by the handling of abrasives. This safeguard assures longer pump life with a minimum of maintenance and without reduction in capacity.

Suction lift

VACSEAL Pumps are capable of suction lifts up to 20" Hg. Because of this suction capability, there is less tendency to air-lock or cease pumping should the intake line become partially obstructed. This feature allows the VACSEAL to be used successfully as a dredge pump or a sump pump.

Chart at right compares these features with six other brands of pumps. Only VACSEAL has all three. Write for FREE bulletin PB-55.



	NO SEALING WATER	SEMI OPEN IMPELLER	CAPABLE OF SUCTION
VACSEAL	✓	✓	✓
PUMP A	✓		
PUMP B			✓
PUMP C	✓		✓
PUMP D		✓	✓
PUMP E		✓	✓
PUMP F	✓		✓

VACSEAL Pumps incorporate design features that have been proven successfully for 19 years. VACSEAL is available with fixed or replaceable rubber liners or all alloy and in a range of sizes from 1½"x2" through 8"x10".

Leaders in Experience & Service

THE GALIGHER co.

**CONSULTATION • ORE TESTING
PLANT DESIGN**



GALIGHER PRODUCTS
Commercial and
Laboratory AGITAIR®
VACSEAL Pump
Vertical VACSEAL Pump
Acid-Proof Sump Pumps
Laboratory Ball Mills
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Home Office: P. O. Box 209

Salt Lake City 10, Utah

Eastern Office: 921 Bergen Ave. (Room 721) Jersey City 6, N. J.



**In
Montana**

... and the World Over BUCYRUS-ERIE SHOVELS Hold Down Mining Costs

The combined high production and consistent reliability of Bucyrus-Erie Ward Leonard electric shovels keep hauling units on the go day after day, month after month for top efficiency. A typical example is this 6-yd. shovel, one of three Bucyrus-Erie 150-B's stripping waste rock and dirt for a large Montana mining company.

In mines all over the world, Bucyrus-Eries in the key spots help assure economical operation, regardless of conditions. Investigate their design and construction and you'll see why. Smooth-acting Ward Leonard control means extra fast acceleration and deceleration to speed work cycles. Superior

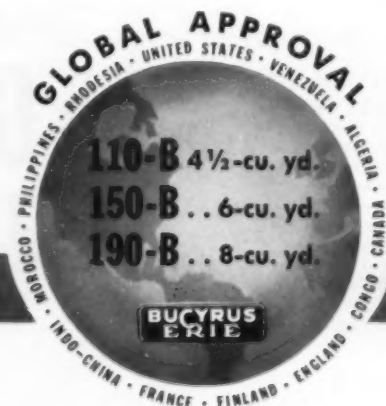
front-end design provides high strength without dead weight. Heavy-duty construction throughout assures long machine life and low maintenance costs.

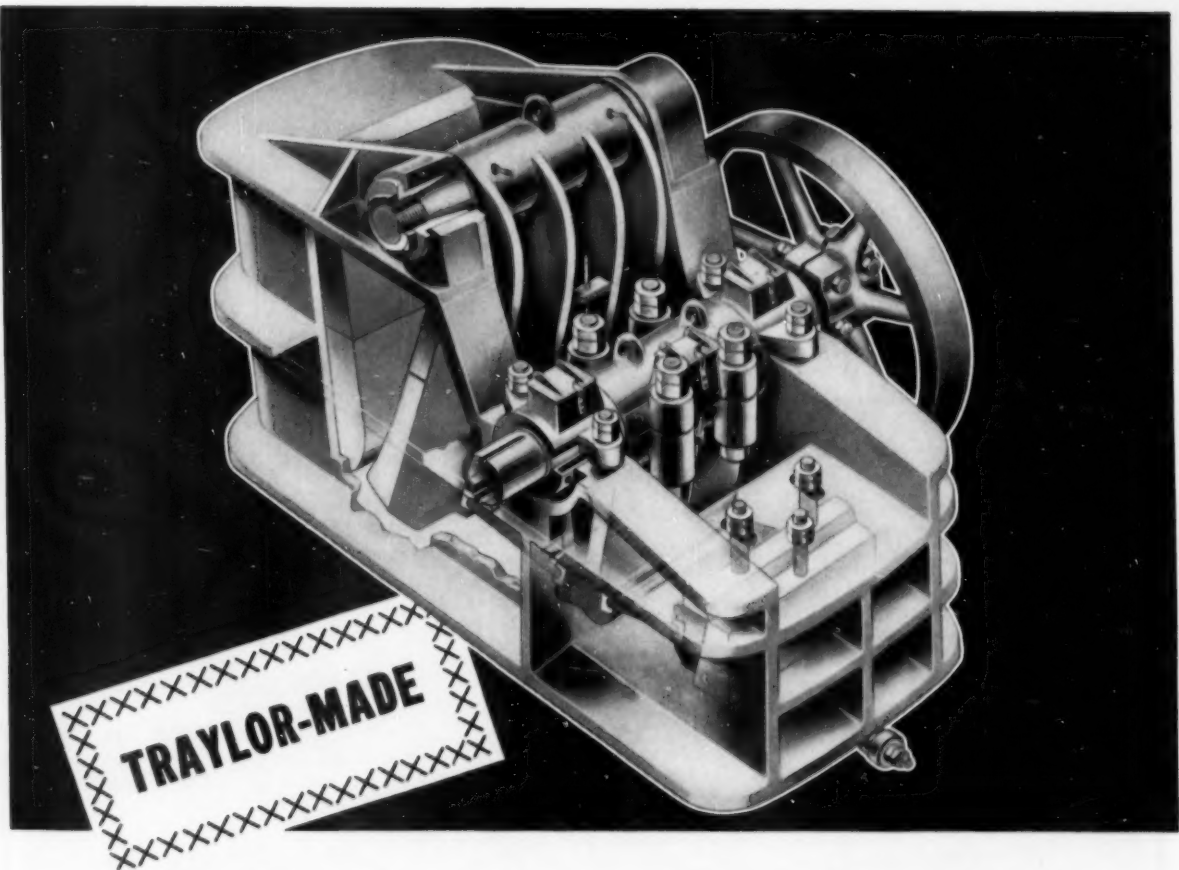
We would be pleased to give you complete information on how Bucyrus-Erie excavators can keep your dirt-moving costs in line.

95L56C

BUCYRUS-ERIE COMPANY

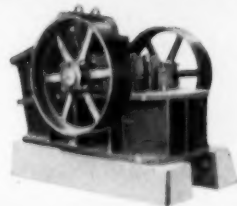
SOUTH MILWAUKEE, WISCONSIN





TO TRIM RUN-OF-MINE ORE REDUCTION COSTS

Every Traylor Jaw Crusher is "Traylor-made" to insure lower production costs on your ore crushing operation. Production requirements as set forth by the customer are combined with Traylor's half century of engineering experience to produce a jaw crusher that achieves greater hourly tonnages, lower maintenance cost and reduced power requirements. Traylor Jaw Crushers are available in 5 types and 33 sizes; feed openings 8" x 12" to 60" x 84". Capacities range from 3 to 1,000 tons per hour.



Write today for a copy of bulletins which describe and illustrate all the cost-cutting features of Traylor Jaw Crushers . . . tell why it will pay to have your next jaw crusher "Traylor-made".



JAW CRUSHERS

TRAYLOR ENGINEERING & MFG. CO.

805 MILL ST., ALLENTOWN, PA.

SALES OFFICES: New York • Chicago • San Francisco
Canadian Mfr: Canadian Vickers, Ltd., Montreal, P.Q.



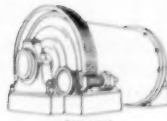
PRIMARY GYRATORY CRUSHERS



ROTARY KILNS



SECONDARY GYRATORY CRUSHERS



BALL MILLS



JAW CRUSHERS



APRON FEEDERS



Milo A. Burdick, plant superintendent,
Southwest Onyx & Marble Co.,
San Diego, California.



"...with UNOBA Grease these bearings last indefinitely."

"Union's UNOBA Grease solved the lubrication problems in our marble and onyx plant 10 years ago.

"Since we placed this remarkable grease on trial in 1946 we have practically eliminated bearing failures despite severe conditions of running water, abrasive grinding mixtures, and in many cases, extreme heat. Take the large crank-pin bearings on our marble gang saws like the one shown here . . . they used to have an approximate life of six months. Now with UNOBA Grease to protect these bearings *they last indefinitely.*

"And by using this same grease throughout our operation we are able to make tremendous savings in maintenance and materials every year. Thanks to Union's UNOBA Grease we have the lubrication situation well in hand."

Few operations demand more of a lubricant than Southwest Onyx & Marble Co., and it's on jobs like this that UNOBA demonstrates its great superiority. If moisture, abrasives and heat are problems in your plant you'll be wise to try UNOBA, too. Immediately available from your nearby Union Oil representative.

76 UNION OIL COMPANY
OF CALIFORNIA

Los Angeles: Union Oil Bldg. • New York: 45 Rockefeller Plaza • Chicago: 1612 Bankers Bldg. • Philadelphia: Eastwick Ave. & Edgewood St.
Dallas: 313 Fidelity Union Life Bldg. • Kansas City, Mo.: 612 W. 47th St.
New Orleans: 644 National Bank of Commerce Bldg.

Gardner-Denver . . . Serving the World's Basic Industries



Lightweight powerhouse for low-cost drilling

Here's the lightweight drilling combination that's easily carried into far corners of the mine—enables one man to run in a remarkable footage record during the shift. Consists of the lightweight FL-48 or FL-58 Sinker mounted on air feed leg with feed travel of 24", 36", 48" or 60".

Lightweight Gardner-Denver drills have the proper combination of characteristics for fast drilling with tungsten carbide bits.

May be equipped with Gardner-Denver air-operated water gland—throttle-controlled—that automatically provides water-on, air-on, air-off, water-off cycle.

Feed legs available with weight-saving aluminum feed cylinder. Push-button bleed for fast retraction. Single air hose supplies both drill and feed leg, and all controls are on the drill back-head.

Send for full details.



GARDNER - DENVER

THE QUALITY LEADER IN COMPRESSORS, PUMPS, ROCK DRILLS AND AIR TOOLS
FOR CONSTRUCTION, MINING, PETROLEUM AND GENERAL INDUSTRY

Gardner-Denver Company, Quincy, Illinois

Export Division: 233 Broadway, New York 7, N.Y., U.S.A.



Tumbling terrain buried more than 500 feet of 5-year-old Anaconda 3/0 Awg SH-D Shovel Cable. Despite accident, cable continued to supply power without interruption to giant shovel.

...and the wall came tumbling down

When this 90-foot wall came down unexpectedly, a five-year-old length of Anaconda 3/0 SH-D Shovel Cable was buried under thousands of tons of jagged rock.

Yet — *after ten days* — the cable and shovel it supplied continued to operate! Later, the cable was relocated—and is still giving service.

NEW BUTYL INSULATION

Longer life, better performing cable is the result of advanced engineering and manufacturing know-how that go into all Anaconda mine cables. Securityflex® Type SH-D Shovel Cable, for

instance, is made with high-grade butyl insulation that withstands ozone, heat and moisture. Neoprene jacket is extremely tough and abrasion-resistant. Patented rubber cores cushion the ground wires and help prevent breaks.

Safety and economy of Anaconda cables have been proven in mines all over the world. The *Man from Anaconda* will be glad to help you on any cable problem. For cable, see your Anaconda distributor. And for copy of booklet, "*... and the wall came tumbling down*," write: Anaconda Wire & Cable Company, 25 Broadway, New York 4, New York.

*Reg. U. S. Pat. Off.

060229

ASK YOUR DISTRIBUTOR FOR



Sharp corner of rock caught and held taut the Anaconda Shovel Cable — but didn't break it.



Giant rock scissors pinched the cable in viselike grip without damage to insulation or ground wires.



Like a guillotine, yet tons of rock did not puncture cable nor interrupt flow of power to the shovel.



Rockfall crushed and partially buried the cable all along its length — but not a single break occurred.

ANACONDA[®] MINE CABLE

JULY 1956



What the
H & P CYCLONES
 are doing for the
COAL INDUSTRY

CHECK THESE ADVANTAGES!

- ☐ Closed circuit operation
- ☐ Recovery of fine coal
- ☐ Prevention of stream pollution
- ☐ Controlled washing water densities
- ☐ Conservation of water
- ☐ Sharp classification for washing operation

H & P Cyclone installations pay for themselves in unbelievably brief periods . . . by reducing the load to, or entirely eliminating sludge ponds, and by increasing the recovery of salable coal.

Ten years of progressive research and thousands of H & P Cyclones in operation

assure you of the finest cyclones engineered into the best designed clarification circuits.

We will gladly arrange for you to visit plants where H & P Cyclones have increased operating profits.

Write for Booklet CT-954.

Heyl & Patterson
 I N C .

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 PHONE COURT 1-0750



The Engineer's Field Report

CASE HISTORY

RPM DeLo Oils

LUBRICANT

*Arizona Sand & Rock Co.,
Phoenix, Arizona*

Sleeve taper only .0045" after 150,000 miles hauling under tough conditions



This Mack tractor's 200 h.p. Cummins diesel went in for its first overhaul after four years hauling heavy equipment to and from Arizona construction jobs. The rig hauls loads up to 25½ tons in on-and-off-highway work. Using RPM DELO Special Lubricating Oil since new, inspection after 150,000 miles showed oil return holes clear, all rings free and in good condition, maximum sleeve taper only .0045". Manley Johnston, Shop Foreman, Arizona Sand & Rock Co., reported, "The engine was really clean! It could have gone at least 50,000 more miles." Arizona Sand & Rock, general contractors for road building projects and operators of a large plant,

works its equipment in constant dust and grit...in desert and mountainous terrain. The company depends on RPM DELO Oils to give the protection these heavy-duty engines need under these tough conditions.

Why RPM DELO Oils reduce wear in heavy-duty engines

Detergent keeps parts clean...helps prevent piston scuffing. Special compounds stop corrosion of any bearing metal and foaming in crankcase.



Special additives provide metal-adhesion qualities...protect parts hot or cold, running or idle.

Anti-oxidant resists lacquer formation...prevents ring sticking.



TRADEMARK "RPM DELO" REG. U. S. PAT. OFF.

FOR MORE INFORMATION about this or other petroleum products of any kind, or the name of your nearest distributor, write or call any of the companies listed below.

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THE CALIFORNIA COMPANY
P. O. Box 780 • Denver 1, Colorado

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Air View of
West End Chemical Co.,
and their latest
STANDARD-HERSEY Dryer

How one GOOD DRYER

LED TO ANOTHER
...and ANOTHER
...AND ANOTHER

West End
CHEMICAL COMPANY *now has*

27

STANDARD HERSEY
DRYERS

To tap the chemical resources of Searles Lake in California's Mojave Desert, it was necessary for the West End Chemical Company to set up a plant at the source of the raw product. Plant Equipment had to be rugged and dependable because repairs and replacement facilities were many long desert miles away.

Rotary dryers are vital to the West End process of manufacturing borates and soda products. Their first dryer in 1926 was a STANDARD-HERSEY and, with modifications, it is still in use. *West End has since purchased 26 additional STANDARD-HERSEY rotary dryers—proof of STANDARD-HERSEY dependability.*

Standard Steel Corporation manufactures more than 30 dryer types. Special equipment can be engineered to fill specific dryer requirements.

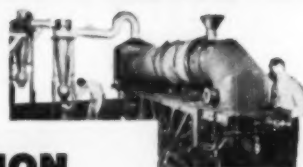


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ILLUSTRATED BULLETIN



COMPLETE PILOT PLANT TAKES
GUESSWORK OUT OF DRYING

STANDARD-HERSEY'S pilot dryers
play an important part in solving your
drying problems *before* blueprint stage.



STANDARD STEEL CORPORATION

5031 Boyle Ave., Los Angeles 58; 15 Park Row, New York 31, N. Y.



HERE'S A MAN-SIZED JOB

This is one of six CAT* DW21s with No. 21 Scrapers which handled *one million tons of clay and rock* during a Nevada winter. Working 20 hours a day, six days a week, these machines stripped overburden at a copper pit near Kimberly. Each unit loaded 15 bank yards in one minute (push-loaded by a Caterpillar D8 Tractor), made the half-mile round-trip haul, and then dumped in 25 seconds. These fast-working yellow rigs are owned by Young & Smith Construction Co. of Salt Lake City, Utah.

Outstanding though this production record is, there is now a *new* Caterpillar DW21 (Series C) and No. 470 Scraper with LOWBOWL design which will move even *more* material in *shorter* time at *less* cost per yard. Its new four-cycle diesel engine develops 300 HP (maximum output) and has a Turbocharger which packs in air according to load, not speed, for more working horsepower and greater performance.

With LOWBOWL design, the 25-yard (heaped capacity) No. 470 Scraper can handle bigger payloads

faster than ever before. The bowl is shallower, wider and longer than old-fashioned scrapers for less resistance throughout the loading cycle. In on-the-job tests, the Cat DW21 and No. 470 Scraper handled at least 20% more material than any other unit in its class.

Whether for coal or metal mining, the application of the Caterpillar DW21 and No. 470 Scraper is the same. With ample power, large capacity, and wide-footprint tubeless tires for good flotation, this big yellow team can speed production and cut costs on *your* operation. Your Caterpillar Dealer—who provides skilled service and parts you can trust—will gladly give you full details. Call him soon.

Caterpillar Tractor Co., San Francisco, Calif.; Peoria, Ill., U.S.A.

CATERPILLAR*

*Caterpillar and Cat are Registered Trademarks of Caterpillar Tractor Co.

**NAME THE DATE...
YOUR DEALER
WILL DEMONSTRATE**

SOUTH DAKOTA MINE REPORTS:

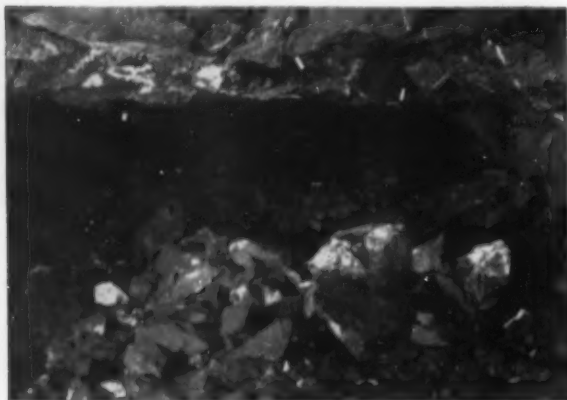
"Du Pont MS Delay Caps give greatly improved fragmentation in stopes



1. BLASTER PRIMING DYNAMITE—Du Pont "Gelex"® #2 (1½ x 8)— with Du Pont MS* Delay Electric Blasting Caps at the Homestake Mining Co., Lead, South Dakota.



2. MINER CONNECTING UP ROUND. Use of MS Delays improves fragmentation, prevents cutoffs and eliminates possibility of dynamite in the muck.



3. ROUND IS READY for firing with Du Pont CD Blasting Machine. These machines eliminate hard-to-maintain permanent firing lines.



4. AFTER THE BLAST. Excellent fragmentation from Du Pont MS Delays reduces secondary blasting and cuts dynamite costs.

You'll benefit by learning more about MS Delay Electric Blasting Caps and the entire line of Du Pont Products for blasting. Ask your Du Pont Explosives representative or write E. I. du Pont de Nemours & Co. (Inc.), Wilmington 98, Del.

*MS" (Millisecond) Delays with copper or iron wires are available in following delay periods: MS-25, -50, -75, -100, -125, -150, -175, -200, -250, -300, -350, -400, -450, 500, -600, 700, -800, -900, -1000



DU PONT EXPLOSIVES

Blasting Supplies and Accessories



BETTER THINGS FOR BETTER LIVING . . . THROUGH CHEMISTRY



Pit-and-Plant Housekeeping needs doing every day!

Your clean-up tasks pay no direct profits, but, if neglected, they can give you ore grading troubles, increase hauling costs, add to equipment-maintenance, and cause downtime that cuts production. One man and a modern motor-grader can do all these necessary "housekeeping" chores day-by-day... save expensive man-hours and production delays before the condition gets so bad it must be dealt with as an emergency involving costly repairs.

That is why we recommend the use of a modern Adams grader on a regular program of mine housekeeping. Here is a list of everyday assignments you probably include among your "housekeeping" problems:

1. **Haul-road maintenance** ... saves tire-wear, speeds hauling, improves safety, keeps production rolling, cuts costs, increases profit.
2. **Clean-up of pit floors** ... permits driving equipment by shortest route, saves wear on tires and crawlers, improves pit drainage, keeps dirt and refuse from weathering into lower levels of ore.
3. **Clean-up after blast** ... the sooner scattered fragments from blast are moved back against toe, the safer for men, tires, and machines that move around your pit.
4. **Clean ore-benches of washed-down dirt** ... the better your grade of ore, the better your price. Leaving silica and other washed-in de-

bris on your benches invites it to wash into cracks, crevices, and drill holes in your ore. Prompt grader-service stops further "wash", piles the material for easy removal by scraper or truck.

5. **Keep concentrating-plant area clean** ... safe to work around... drive around. There is occasional spill over the sides of heaped trucks, around conveyors, grizzlies, hoppers, trestles, and it pays to clean it up... daily. Keep roads, runways, and working areas around the plant neat, clean, and workable.
6. **Keep toes of stockpiles pushed in** ... they contain valuable merchandise. Weather and loading operations tend to spread your stockpiles, eat up valuable work-space, waste stored material. To load from this thinly spread toe gives inferior grades, increases loading cost. A few minutes work with a motor-grader once or twice a week keeps your stockpiles clean, gives more work-room.
7. **Keep drainage open** ... don't let puddles stand. Your pit area continually needs new drainage ditches. As old ditches fill, you need to clean them out. The best answer to ditch problems is the modern motor-grader. Watch an Adams grader work... you'll quickly see why a few hours a week with an Adams will keep your ditches clean and your pit dry.

8. **Level and spread on dumps** ... means that trucks drive faster coming on... and faster off... safer, too. Adams spreads material clear over the edge with offset blade that reaches far out beyond leaning wheels that hold against side thrust. An Adams travels up to 25 mph... doesn't take long to get up on the dump, clean-up, and get back to the pit, working the haul-road both ways.

9. **In winter**, blade-grading of snow and ice quickly cleans pit and plant roads for safe, fast hauling. If there are drifts to lick, a V-plow attachment on your Adams grader helps open blocked roads quickly.

10. **For exploration teams**, a modern motor-grader to maintain haul-roads is a "must". Once heavy clearing is out-of-the-way, an Adams heavy-duty grader can build you a mile of well-graded-and-drained highway in a matter of hours.

It may be a good idea now to check your pit and plant housekeeping. Check, too, your available graders... compare them with the work-ability and versatility of a modern Adams. Perhaps it's time for a change? A new broom sweeps clean... a new Adams could revitalize your housekeeping program! Write for further information. And if you'd like reprints of this advertisement to use in discussing "housekeeping" with your staff, just tell us how many copies you need.

A size ADAMS for every need

Model 660—150 hp diesel engine, 27,730 lbs.

Model 550—123 hp diesel engine, 23,500 lbs.

Model 440—104 hp diesel engine, 21,500 lbs.

Model 330—80 hp diesel engine, 20,500 lbs.

Adams optional equipment includes dozer blades, scarifier, snow plow, and snow wing.



Good haul roads speed hauling, save tire wear and truck maintenance, improve safety. Adams graders do this work fast, at low cost.

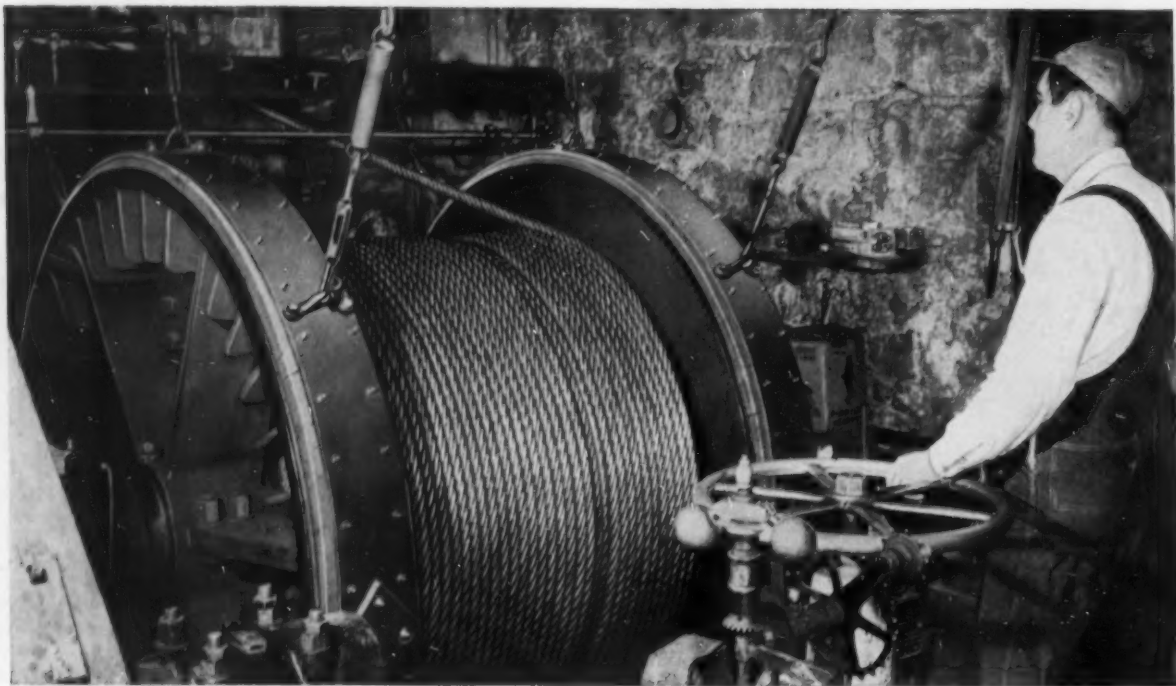
AG-6-M-b



LeTourneau-WESTINGHOUSE Company

Peoria, Illinois

A Subsidiary of Westinghouse Air Brake Company



Another hoistman says . . .

"Tiger Brand spools best . . . doesn't fight"

George Marinos, hoistman at Utah's Royal Coal Co.'s Mine, says, "Tiger Brand Wire Rope doesn't twist and fight on the drum." And when wire rope makes this kind of friend—you know the rope has earned the compliment. Such men are only impressed by performance. George has had 2,200 feet of Tiger Brand rope on for the past twenty months. And it's been twenty months of continual stress and scrubbing for the rope. Yet this USS wire rope is still in top shape and promises many more months of dependable service.



1½" Tiger Brand brings up another 25-ton load. This haulageway pitches down a steep 34% grade and whips around such sharp curves that switchbacks are required. The Royal Mine has been working 2 shifts for about 24 months—that's about 406,000 tons of coal this Tiger Brand line has already hauled. The hoistmen say its tough, fatigue-resisting wires and spooling qualities make it ideal for haulage work.



For all mining work—depend on Tiger Brand Wire Rope to give longer, more reliable service. And when you want to talk with a specialist on mining rope application—call in a Tiger Brand Field Engineer for expert advice. Do this by contacting your local distributor or write Columbia-Geneva Steel, 120 Montgomery St., San Francisco



USS TIGER BRAND Wire Rope

United States Steel Corporation • Columbia-Geneva Steel Division

UNITED STATES STEEL



Rubber-tired rig works fast on watery pit floor

A large Ohio quarry, producing 700,000 tons of limestone yearly, uses one rubber-tired Tournatractor to handle all clean-up and pit maintenance. The tractor covers 325 acres ... maintaining and building haul roads, moving freight cars, pushing in toe of stockpiles, bunching blasted stone, cleaning around shovel.

6" of water, no barrier

A few days before these pictures were taken, heavy rains left as much as 6 inches of water on the quarry floor. Rolling easily on its big 21:00 x 25 low-pressure tires, the tractor maneuvered in and out of the watery loading area, handled its assignments quickly and efficiently.

A major Tournatractor advantage when working in rain and water is that all moving parts in its power train are completely enclosed. They operate in a constant bath of oil, sealed against moisture. Lubricants stay in to prevent corrosion and

maintain machine's high-operating efficiency and low-maintenance cost.

"Beats crawler on rock"

Foreman Bernard Boli said, "Tournatractor has crawler beat all to pieces on rock ... gets around 1¼-mile quarry easily. Our biggest reason for buying the Tournatractor was speed." And operator Charles A. Slover said, "Tournatractor is a wonderful machine for the operator. It doesn't beat you around like a crawler. Besides lubricating quickly, and being able to move six 45-ton-load cars, I like the ease of riding."

Perhaps you can use a 208 hp rubber-tired "Quarryman"

To handle widely scattered dozing, pushing, and clean-up assignments, let Tournatractor help you speed operations, save you money. Let us show you owner-verified performance records of Tournatractor on work similar to yours.

▲ Tournatractor moves in between shovel-swings to clean up spillage and doze blasted stone for easier loading. Shovel cycle is not interrupted, because of rubber-tired tractor's sure-footed speed on uneven pit floor.

Tournatractor handles dozing quickly ... gets good blade-full of rock, moves about 2½ cubic yards in 30-ft. dozing run. Versatile machine handles many other quarry assignments, pushes in blasted stone, cleans up around stockpiles, pulls other equipment around quarry.



▼ Versatile Tournatractor dozes overburden between cleanup and other assignments. Shovel in background removes 6' to 10' of overburden. Tournatractor quickly cleans stone shelf so that production shovels can move in.



Tournatractor—Trademark Reg. U.S. Pat. Off. T-997-Q-b



LeTourneau-WESTINGHOUSE Company

Peoria, Illinois

A Subsidiary of Westinghouse Air Brake Company



CAL-WIC INDUSTRIAL SCREENS

Today, as never before, Cal-Wic Industrial Screens are being used in the expanding construction industry of America. Contractors know they can depend on Cal-Wic Screens because they are tailor-made for accurate sizing and long life, resulting in less downtime and greater production.

Every phase of production of CF&I Cal-Wic Industrial Screens is checked by exacting quality controls to assure that highest standards are maintained. The steel used is specially-selected, basic open hearth steel which has the right balance between hardness and toughness. Cal-Wic Industrial Screens are then woven on powerful looms. They have tight wire intersections and openings that will retain their original size.

There's a CF&I sales engineer always within easy reach . . . ready to give you prompt assistance with any operating problem that might arise. For complete details, contact our nearest District Sales Office.



3612

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CANADIAN REPRESENTATIVES AT • Calgary • Edmonton • Montreal



Simple rear-dump construction pays off



Construction of the Tournapull Rear-Dump has been radically simplified from that of a conventional heavy-duty hauler. In place of a foundation frame and body sub-frame, Tournapull Rear-Dump hitches rear and front wheels through a horizontal yoke extending back from the kingpin and pivoted to the body itself just above and ahead of the rear wheels. Body is simpler, much stronger . . . has no frame and sub-frame to get out of line.

Look at the photo above . . . note the absence of springs, spring hangars, and tie rods. Low-pressure tires adequately absorb the shocks of rough haul-road travel and high-speed loading. Eliminated are spring maintenance, replacement time and cost of spring parts.

Front wheel drive and kingpin-type steering help simplify Tournapull construction, too. No longer must power be carried back to the rear through a drive-shaft. Bearing and lubricating problems of a long drive-shaft are eliminated. No longer is steering handled by small front

wheels subject to misalignment. There are no tie rods, no hinged steering connections to become twisted or bent.

Nor do you have the troubles of hydraulic hoists or gravity dumping with these Rear-Dumps. Dump is by an electric winch that lifts the body up on twin cables. Operation is under complete control at all times, with positive power for dump and return controlled by an electric switch on the dash. There are no oil seals, no high-pressure lines and jacks to keep tight, no freezing up in cold weather as with hydraulics. There are no shock loads as in gravity dumping. You save on regular maintenance time because there is no hoist mechanism to check . . . only a few places to lubricate.

Let us show you how these savings can put money in *your* pocket. For proof, we'll be glad to show you performance figures from a job like yours, or, if you wish, give you names and addresses of owners of Tournapull Rear-Dumps, so you can check for yourself. Call soon.

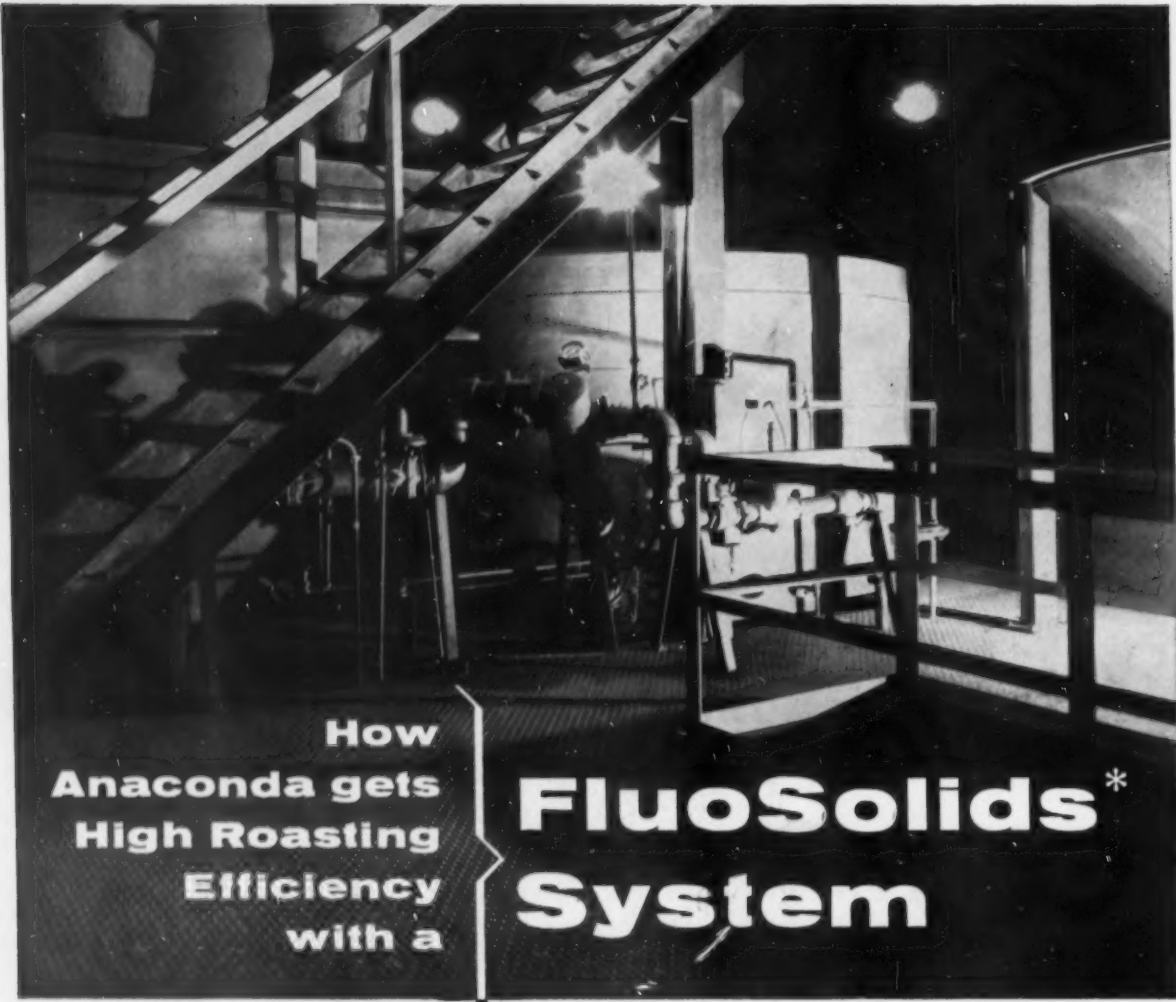
Tournapull Rear-Dumps Come in Sizes to Fit Your Needs

"D"	"C"	"B"
11 tons	22 tons	35 tons
138 hp	208 hp	293 hp
Prime-movers also power interchangeable scrapers, bottom-dumps, flat-beds, and cranes.		

Tournapull—Trademark Reg. U.S. Pat. Off. R-774-G-b



LeTourneau-WESTINGHOUSE Company
Peoria, Illinois
A Subsidiary of Westinghouse Air Brake Company



**How
Anaconda gets
High Roasting
Efficiency
with a**

FluoSolids^{*} System

For sponge iron production at Anaconda, Montana, Anaconda Company needed a calcine containing less than 1% sulfur. Their conventional fixed bed pyrite roasters, producing gas for an acid plant, delivered a calcine averaging 2 to 6% sulfur. The problem was solved by installing a Dorrcol FluoSolids System for an additional roasting stage.

Unique in this installation is the fact that roasting is carried out autogenously on pyrite containing as little as 2% sulfur. Only outside fuel required is for starting up the System.

What's more, with sulfur in the feed all the way from 1 to 9%, calcine from the FluoSolids System consistently contains 0.8 to 0.9% S. The FluoSolids Reactor has an inside diameter of 10' and handles 200 TPD at 1200°F.

High roasting efficiency is just one of the many advantages of fluidization. If you'd like more information on the Dorrcol FluoSolids System, the most significant advance in roasting techniques in the last 30 years, just drop a line to Dorrcol Incorporated, Stamford, Connecticut.

*Trade-Mark Reg. U. S. Pat. Off.



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CYANAMID

REAGENT NEWS

"ore-dressing ideas you can use"

How Gold Mines Benefit by Using AEROFLOC® Reagents

Below are three verbatim reports by a Cyanamid Field Engineer on the use of AEROFLOC Reagents to improve thickening and filtration, as observed at several African mines:

"At _____ Mines where weathered surface ore is treated, AEROFLOC has made improvements sufficient to put this operation on a paying basis. They use both AEROFLOC 548 and 3000 Reagents and now get a practically crystal-clear thickener overflow. This has radically improved clarification which previously gave endless trouble. Precipitation efficiency is remarkably good, zinc consumption has been greatly reduced, bullion improved and precipitate smelting costs are lower. In this section alone savings practically paid for the AEROFLOC. In addition, they have been able to rearrange the counter-current decantation plant to get four stages instead of the previous three".

"Use of 0.02 lb. per ton AEROFLOC 548 Reagent at _____ Mining Co. Ltd. has made it possible to treat 300,000 tons of surface ore previously considered to be so hard to settle as to be untreatable. After

grinding, their pulp goes to bowl classifiers. The rake product is leached and the overflow cyanided after thickening. At first they added AEROFLOC 548 Reagent to the bowl classifier but got better results when it was added to the thickeners which treat the bowl classifier overflow".

"As you know, _____ is a small property recovering gold by amalgamation and cyanidation. They increased the rate of sedimentation by 25% and reduced gold losses, too, by adding 0.01 lb. per ton AEROFLOC 3000 Reagent to the thickeners (after amalgamation and prior to cyanidation). Filtration rate has been increased to a point where they get by with one drum filter instead of two. Their books show that AEROFLOC costs a penny a ton whereas increased recovery alone is four pence worth of gold per ton".

These are typical of reports of results on gold operations the world over. A Cyanamid Field Engineer will be glad to help you benefit by using AEROFLOC Reagents to improve thickening and filtration. A phone call or letter to our nearest office will get prompt attention.

AMERICAN CYANAMID COMPANY

MINERAL DRESSING DEPARTMENT

30 ROCKEFELLER PLAZA, NEW YORK 20, N. Y.

Cable Address - *Limenitro*, New York

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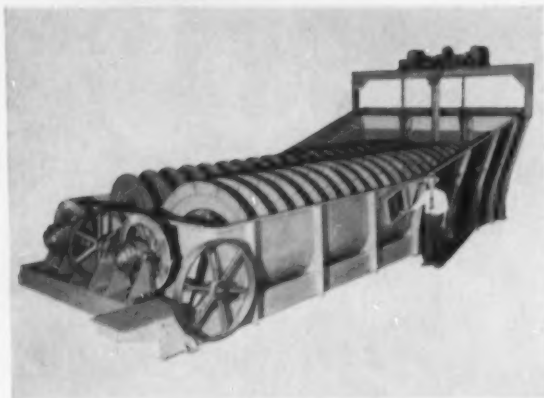
CYANAMID PRODUCTS, LTD., Bush House,
Aldwych, London W. C. 2, England
SOUTH AFRICAN CYANAMID (PTY.) LTD.,
P. O. Box 7552, Johannesburg, Union of South Africa

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Of. 6, Lima, Peru
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COST CUTTING EQUIPMENT

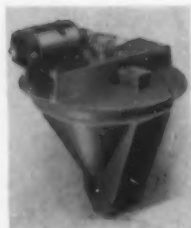
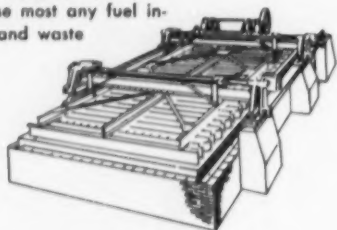
AKINS CLASSIFIERS AND HEAVY MEDIA SEPARATORS



The Akins Classifier was originally developed, in 1908, for use in closed circuit with a ball mill. Its outstanding success led to many other profitable applications where it has demonstrated its superiority . . . dewatering and recovering fine solids; sand and slime separations; washing coal, sand, and oyster shell; desliming and de-oiling phosphate

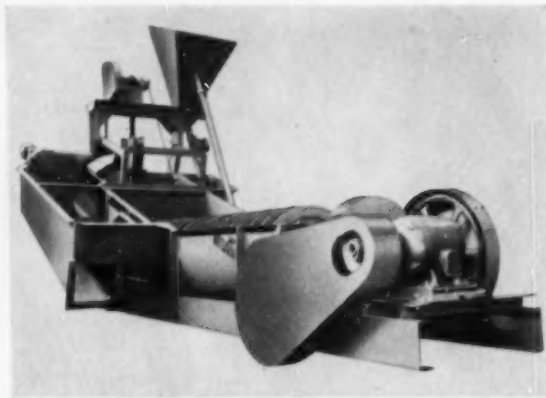
LOWDEN DRYER

For drying flotation concentrates, graphite, clays, ground minerals, paint fillers, pigments, various precipitates. Can use most any fuel including live steam and waste heat.



VEZIN SAMPLER

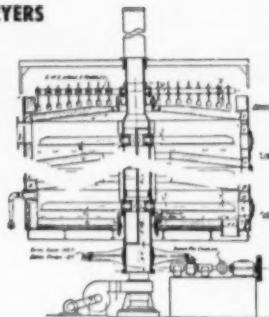
A continuous sampling device generally used for 5 and 10% cuts on crushed feed. Alloy white iron cutting lip. Rubber or abrasion resistant plate lining inside. Compact direct driven faced tooth bevel gear drive. Easy addition of mixing barrel, operated from same drive.



rock and concentrate; sink-float concentration; and many others. The Akins is made in sizes up to 84", simplex and duplex, in two types—small and large settling pool. The Akins Heavy-Media Separator is the only unit available which can make a 3-product separation in one machine from one medium cleanup circuit.

SKINNER ROASTERS AND DRYERS

For roasting, calcining, and drying ores, clays, limestone, limestone mud, flotation concentrates, decomposing oil sludge in the process of recovering sulphuric acid. Coal, oil or gas fired. Sizes to 23'6" inside diameter; up to 12 hearths.



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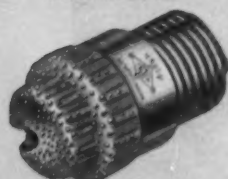
1910 Our 46th Anniversary 1956



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TRUCO CONCAVE
BLAST HOLE BIT



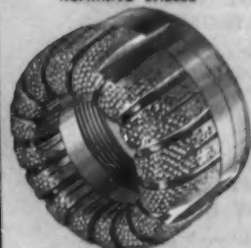
TRUCO PILOT BIT



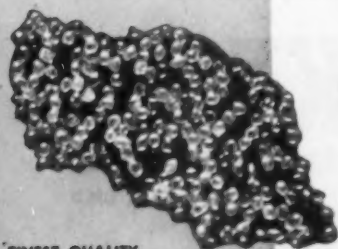
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TRUCO
REAMING SHELLS



TRUCO STANDARD
OIL FIELD BIT



FINEST QUALITY
DRILL BORTZ

In the American tradition

Twice a day a quick transformation overtook the old frame garage on John R Street, Detroit. At seven in the morning, the doors swung open, a spindly car chugged out and the garage became a busy little workshop. Some time after dark, the car was driven back in and, for a few hours, the workshop was a garage again.

As a workshop, it had for us a very special significance—it was here that our Company came into being and set up the first local shop devoted exclusively to making industrial diamond tools.

But, far more important, it was the first place in the whole midwest where industry could find a complete stock of fine industrial diamonds, imported direct to Detroit, and superior to stocks previously available only in New York.

Such convenience is taken for granted nowadays and the mails deliver thousands of our diamond selections yearly, but, in those days, it was an innovation and so useful that in almost no time at all, the old frame garage (which had cost \$50.00) needed a 12-foot addition (which cost another \$50.00).

And, that was but the beginning. Today, our plants are the most modern in the industry and in the intervening 46 years our laboratories have pioneered many of the most significant innovations in diamond tool technology, including *Engineered Diamond Tools** and Truco Engineered Diamond Bits.

And, today, in every major drilling operation throughout the world, Truco Engineered Diamond Bits enjoy a unique reputation for fast, accurate, dependable cutting in any formation and for their ability to deliver important economies in rig time and footage costs. May we send you the Truco Diamond Bit Catalog?

**Engineered Diamond Tools are diamond tools engineered to the job and guaranteed to do it.*

TRUCO DIAMOND BITS

by

WHEEL TRUEING TOOL COMPANY

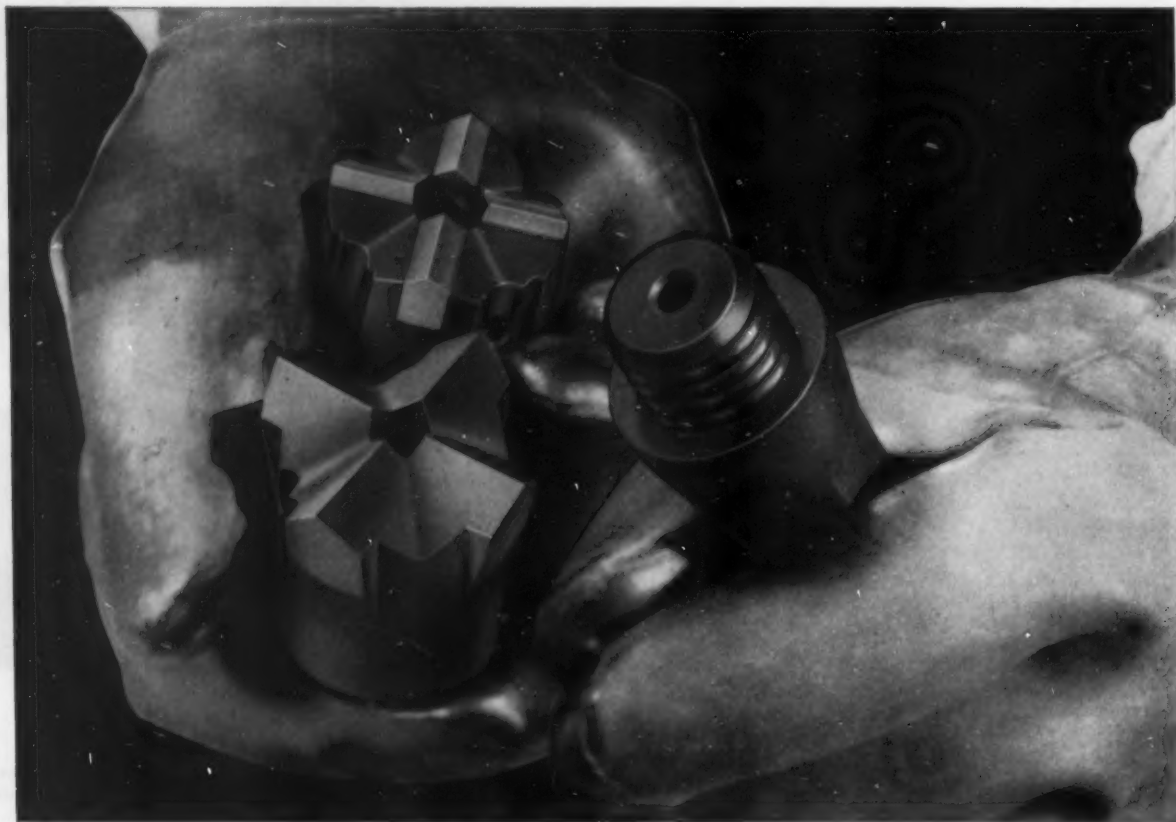
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WHEEL TRUEING TOOL CO. OF CANADA, LTD.

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Use the same drill steel —just switch the TIMKEN® bits

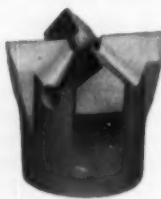


***TIMKEN® interchangeable rock bits
let you switch bit types
without switching drill steels***

TIMKEN® interchangeable bits do away with the old-style, time-wasting chore of changing drill steels every time bit types are switched. Now drillers use the same drill steel, easily and quickly switch Timken bits as the ground changes—right on the job. Dozens of Timken bits, both multi-use and carbide insert, fit the same drill steel. It takes only a minute or less to unscrew one Timken bit and screw on a different one. Work keeps moving by using the most effective and economical bit for the ground conditions.

And savings mount. You can cut costly drill steel inventory. You get long, economical bit wear because Timken bits are made from electric furnace Timken fine alloy steel. We're the only American rock bit manufacturer that takes this extra quality control step. And Timken bits have a shoulder-union especially developed by the Timken Company that keeps drilling impact from damaging threads. Our rock bit engineers will gladly help on your drilling

problems. They'll put their more than twenty years of experience to work to help you cut your drilling costs. Just write: The Timken Roller Bearing Company, Rock Bit Division, Canton 6, Ohio. Cable address: "TIMROSCO".



WHERE YOU CUT COST WITH TIMKEN MULTI-USE BITS

Most economical for ordinary ground. With correct and controlled reconditioning, they give the lowest cost per foot of hole when full increments of steel can be used.



WHERE YOU CUT COST WITH TIMKEN CARBIDE INSERT BITS

Give highest speed through hard, abrasive ground. Also most economical for constant gauge holes, small diameter holes, very deep holes.

your best bet for the best bit...for every job

TIMKEN

TRADE-MARK REG. U. S. PAT. OFF.

Drifts and Crosscuts

Farm Bill, Good News For Miners

Industry leaders have long been concerned with the danger to the metal markets imposed by the recent metal barter. Under this program the Agriculture Surplus Disposal Agency of the Department of Agriculture has been using agriculturists to barter surplus farm crops for foreign metals and minerals. Much of the surplus crops being bartered is government subsidized under one of the many farm programs.

Once the barter deals had been made, the Commodity Credit Corporation, another Agriculture agency, received title to the minerals and had the authority to trade, sell, exchange etc. them; in fact, the only way that CCC could be reimbursed for expenses was to sell the commodities as the best opportunities developed.

Under this program the domestic miner was continually threatened with CCC sales on the open market. The metal market noted for having a characteristic sharp reaction between supply and demand is so sensitive that such sales could drop the market far out of proportion to actual sales volume.

Fortunately the new farm bill (Agricultural Trade Development and Assistance Act) signed by President Eisenhower early in June requires that all bartered commodities must go in to the supplemental stockpile and can only be released by Joint Resolution of Congress.

Under the new law bartering will remove commodities from world markets before they can be dumped in the United States markets. The result should be firming of domestic metal prices.

Alaskan Governor Speaks For Mining

The problems of financing gold mining in Alaska today were carefully reviewed in this "Drift and Crosscuts" section of the February issue of MINING WORLD. The article has been very favorably received in the Pacific Northwest and in the Territory; in fact, it has started a great many people thinking about ways to stimulate Alaskan mining. One of the most outspoken advocates for mining expansion in Alaska is Governor B. Frank Heintzleman. In a recent speech he recommended that tax incentives be allowed companies undertaking exploration and development of Alaskan minerals. He further recommended that these be federal tax incentives and that they should apply to a company's Alaskan operations for 10 to 15 years.

This is sound thinking, Governor. It certainly has advantages in the United States too, and in fact has been recommended by many mining associations and Senators. However, the Alaskan case is even stronger because Alaska so desperately needs industry and development. Increased mining in Alaska will reduce the dependence of the Territory on the taxpayers of every part of the United States.

The Small Miner's Place

The May 24th announcement of the United States Atomic Energy Commission in extending the domestic uranium program through December 31, 1966 is fully outlined in the Fission Facts section of this issue.

Recent testimony before the Senate Interior Subcommittee on Minerals, Materials, and Fuels by both government and industry witnesses recommending an extension of the government's tungsten purchase program is outlined on the "Capital Concentrates" pages.

Significantly, the AEC announcement and government recommendations on tungsten both contained top purchase limits for any one mining operation or mining property. For uranium it was 500 tons of U_3O_8 per year. Several figures from 5,000 to 12,000 units of tungsten per month have been advocated for tungsten.

The need for such limitations is clear. There is much room for argument as to the wisdom of any figure. AEC has protected itself, and the large producer, too, who must operate his mill at maximum capacity on low-grade ore by saying "The Commission, at its option, . . ." The 500 tons of concentrate figure back to about 200,000 tons of Plateau ore so only a few producers need worry about this phase after it starts in 1962. True, there are more than a few producers exceeding this rate by substantial margins at today's production rates, but how many will be able to do it from 1962 through 1966?

The tungsten limitation figure should be set nearer the lower figure to give more mines a longer time to produce. The proposed tungsten ceiling of 1,000,000 units could be stretched out several months at the smaller figure to the benefit of many small miners.

The important thing is that the government recognizes the basic need for the small miner in both programs. Everyone in the mining industry knows why. MINING WORLD commends the soundness of both programs.



New Stoper Drill Design Combines 30% Reduction in Weight with 10% Faster Drilling Speed

Use of modern materials in new Le Roi-Cleveland S-10 Stoper results in easier handling.

With the introduction of the new Le Roi-Cleveland S-10 Stoper, great strides have been made in easing the work-load of miners. At the same time, their productivity, in terms of footage drilled per shift, has been increased.

New stoper uses aluminum feed leg to help decrease weight as much as 30% and provide better balance. This type of feed leg, already so successful on Le Roi-Cleveland Air Legs, contributes greatly to weight reduction: The S-10 with 18-inch steel change weighs only 79 lbs!

10% faster drilling speed results from a combination of de-

sign features: The new valve is timed and ports are arranged so that a maximum flow of air is delivered to the piston on both downstroke and upstroke. Hard-hitting, rock-shattering blows result, along with a rotation that's strong enough to turn the steel in the worst kind of drilling.

The variable feed-pressure control also adds greatly to the performance of the S-10. It has a wide enough range to feed the machine properly against all kinds of rock. Maximum drilling speed is attained. At the same time, both bit life and machine life are increased.

Exclusive steel puller permits the use of collared steel. This is of special advantage in tight ground, where stuck steels used to be a problem. The new steel puller, consisting of only 5 parts, also makes stoper operation safer. Since the steel never leaves the machine, the danger of falling drill steel is eliminated. The new S-10 Stoper is also available with tappet-type construction for shankless steel.

Three sizes of feeds are available. The S-10 can be supplied with 18, 24, and 30-inch steel changes for $\frac{7}{8}$ and 1-inch hexagon or quarter-octagon steels, with or without collared shanks.



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Capitol Concentrates

Senators Get Domestic Mineral Facts; Tungsten Purchase Extension Suggested

Testimony concerning mineral purchase programs was presented before the Senate Interior Subcommittee on Minerals, Materials, and Fuels by government and industry witnesses during May. Under discussion was the series of bills to initiate or extend government programs covering domestically mined antimony, asbestos, beryl, chromite, columbium-tantalum, fluorspar, manganese, mercury, mica, and tungsten.

As expected, ODM Director Flemming reiterated his previous statements that "ample authority exists under the Defense Production Act . . . to procure materials for national defense" and that "measures which are primarily for economic relief should not be handled as a part of the defense program." After summarizing defense needs for the individual minerals, he gave ODM's solution in each case as follows:

Mica and beryl: GSA is to advise concerning the financial requirements needed to extend the programs for five years to June 30, 1962, and as soon as this information is available, GSA will be authorized to make this extension;

Chromite: The present program will continue through June 30, 1957. In addition, ODM does not believe that the program should be discontinued until it has had the opportunity of exploring the matter further; that if there is a reasonable doubt as to whether or not the program would ultimately provide us with a meaningful mobilization base, the doubt should be resolved in favor of a continuation of the program;

Manganese: the carload lot program can remain open until the quota (19,000,000 long ton units) is reached and there is a possibility of some increase in the quota. Therefore, the termination date for the carload lot program will be extended to June 30, 1961;

Mercury: This program will remain in force until the end of 1957, so ample time exists to ascertain whether a change in defense needs would justify an intensification or extension of the program;

Antimony: GSA has been instructed to ascertain the price that would have to be paid to "make meaningful" the stockpile procurement directive requiring that preference be given to antimony obtained from domestic sources;

Fluorspar (metallurgical grade): GSA has been authorized to determine by actual negotiation the premium necessary for domestic production, following which GSA will be authorized to pay "an appropriate premium price" for domestic production;

Columbite and tantalite: The defense position does not justify additional purchases of columbite and tantalite;

Asbestos, tungsten, and fluorspar (acid grade): Since quantities on hand and on order for these three materials are almost equal to or exceed both minimum and long-term stockpile objectives, the Con-

gress should take "appropriate action" to assist the industries by providing for purchases of specified amounts from non-defense funds until Congress has had time to consider recommendations from the Department of the Interior for a long-term program.

Assistant Interior Secretary Felix E. Wormser, in presenting the Interior Department's views, concurred with the ODM position. He recommended that "special provisions be made by the Congress to continue purchases" of tungsten and asbestos and said he would study the situation with respect to acid-grade fluorspar.

For tungsten, Wormser suggested a purchase program for a period of not more than two years, with a quantity limitation of 1,000,000 units at not more than \$52.50 per unit, and with a quantitative limit on purchases from any one mine. Such a program, he said, should be financed by direct appropriation of the Congress.

• Seaton Appointed Secretary of Interior

The appointment of Fred A. Seaton, former Senator from Nebraska and present White House assistant, to the post of Secretary of the Interior came as a complete surprise to Washington and Congressional circles. The move to appoint Seaton was politically astute. The confirmation of a former Senator traditionally is a routine matter and Seaton, personally, is well liked. Seaton, it is said, has had a big hand in developing White House mineral policies.

• Unity Within An Industry Brings Results

The Administration does not want to apply the wool subsidy principles to strategic minerals produced in the United States; nor does it favor import quotas for those minerals. However, it is very solicitous about the oil business to which import quotas has been applied. Said a trade journal in May of this year: "The government warned crude oil importers against bringing in as much crude as they plan during the second quarter of this year. . . . If imports get too large, the government can put on controls."

Unity and determination in the domestic wool and oil businesses produced these results.

• Price Restrictions Nullify Mineral Programs

How the Office of Defense Mobilization can announce a domestic mineral program and yet not be obligated to buy is illustrated by the domestic mercury program announced July 6, 1954.

At a time when the market was \$325 per 76-pound flask, ODM announced a ceiling on its purchases of \$225 per flask for up to 125,000 flasks. To date, five flasks has been bought. It is understood these were tendered by a whimsical domestic producer just to see if they would be accepted.

A recent Senate bill would increase the ceiling to \$275 per flask on the basis that if the price fell to

\$225 the domestic producers would go out of business and ODM would not have to complete its program anyway. Testimony before the Senate Interior Subcommittee on Minerals, Materials and Fuels indicates that some of the major producers might survive at a price of \$250 per 76-pound flask.

It may also be noted that the long-range manganese purchase program (not to be confused with the low-grade or carlot programs) states that preference shall be given to domestic manganese if it can be acquired at the market. You can imagine how much has been bought!

● Percentage Depletion Proposal Goes Too Far

A recent bill by Senator Martin of Pennsylvania illustrates the length to which extreme advocates of percentage depletion will go. While the principle of percentage depletion is good and essential to a healthy mining industry, "fringe benefits" tend to strengthen the hands of those who wish to abolish it. The new bill, S. 3806, would permit percentage depletion to those "who, under a permit from or with the permission of the United States, extract sand or gravel from navigable water of the United States." Such a producer is to be treated "as the owner of an economic interest in the deposits from which such sand or gravel is extracted, and such deposits shall be deemed to be depleted by such extraction."

● Important Points Were Neglected

During his testimony on the extension of the various mineral purchase programs, given before the Senate Interior Subcommittee on Minerals, Materials and Fuels, Assistant Secretary of the Interior Felix

Wormser made much of the undesirability of subsidizing the mining of "sub-marginal" ores, stating that the mining industry would be weakened rather than strengthened. Evidently the stress on "sub-marginal" was deliberate as it sounds worse than marginal. He also recommended that high-grade parts of the mine be mined when prices are low and low-grade ores when prices are high, so one could get along without subsidies. Nice work if you have that kind of a mine!

That dumping of metals by foreign producers makes many domestic mines marginal was not stressed enough. Also, when you buy tungsten, for example, outside of the United States, the money is gone. It has been stated that of the \$63 per unit paid to domestic producers, \$25 goes for taxes. Therefore, we are actually producing at an equivalent rate of \$38 per unit.

COMING CONVENTIONS

September 4 through 11. INTERNATIONAL GEOLOGIC CONFERENCE, Mexico D. F., Mexico.

September 24 through 28. Annual conference and machinery exhibit of the ATOMIC INDUSTRIAL FORUM, Navy Pier, Chicago, Illinois.

September 26, 27, 28. Annual ROCKY MOUNTAIN MINERALS CONFERENCE, AIME, Salt Lake City, Utah.

September 30 through October 2nd. Joint convention and exposition of the AMERICAN MINING CONGRESS ON SURVEYING AND MAPPING and the AMERICAN SOCIETY OF PHOTOGRAMMETRY, Shirley Savoy Hotel, Denver, Colorado.

October 1 through 4. Mining show and exposition of the AMERICAN MINING CONGRESS, Shrine Hall, Los Angeles, California.

November 1, 2, 3. Annual convention of the NEW MEXICO MINING ASSOCIATION, Carlsbad, New Mexico.

RESISTO-LOY Reduces Excessive Maintenance Costs

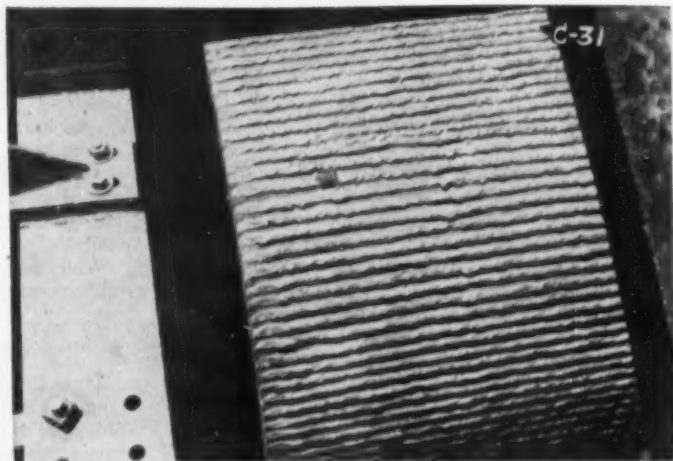
on CRUSHER ROLLS

In the use of RESISTO-LOY on manganese crusher rolls, the old rule applies—"It's not the first cost, but the upkeep that counts". If you are crushing large tonnages of hard materials daily, and if you are forced to maintain the rolls constantly, we can put a stop to the excessive costs of such maintenance. In the American way, the good old competitive way, we can be sure of one thing—"we get just what we pay for".

Regardless of price, we invite you to prove that statement to your own complete satisfaction. Good things DO cost more, and if you want the satisfaction obtainable from a composition of the finest metals available, then you can get this satisfaction from RESISTO-LOY.

The above illustration shows the correct application of RESISTO-LOY to produce $\frac{3}{4}$ " minus materials. This is a job your plant welder can efficiently handle. Call in our Field Man. Let him show you how to cut maintenance costs on your rolls. He is a Specialist. You can count on his advice and recommendations.

THE RESISTO-LOY CO., INC. — Grand Rapids 7, Michigan



5 "Euc" REAR-DUMPS

10 to 50 Ton Capacities

for CONSTRUCTION, MINE, QUARRY and INDUSTRIAL WORK

10-Ton

Model UD has 128 h.p. engine
... 10-speed transmission ...
36 m.p.h. loaded travel speed
... spring mounted drive axle
with 12.00 x 24 duals.



There are two
15-Ton models with
5-speed transmission
and 14.00 x 24 tires. Model
FD has 165 h.p. engine, and 10 cu. yd.
body. Model R-15 has 218 h.p. engine,
spring mounted drive axle, power steering and
10½ cu. yd. body. Quarry body is available
for either model.

15-Ton

22-Ton



Model TD "Euc" is equipped with 300 h.p. engine,
spring mounted drive axle with 18.00 x 25 duals,
power steering and 15 yd. body. Available with
Torqmatic Drive or 10-speed transmission. Standard
or quarry body is available.

34-Ton



Model FFD has two engines providing a total of
400 or 436 h.p. to tandem drive axles through separate
Torqmatic Drives. Dual tires are 16.00 x 25. Exhaust
heated body has 24-yd. capacity.

50-Ton

Similar in design to the Model FFD "Euc", the
50-ton Twin-Power Model LLD has a total of
600 h.p. and an exhaust heated body with
32-yd. capacity. Tires are 18.00 x 33.



Euclid Equipment

FOR MOVING EARTH, ROCK, COAL AND ORE



READ WHY SO MANY MINING MEN SPECIFY BOSTON HOSE AND BELTING

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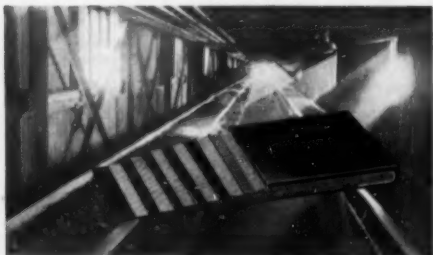


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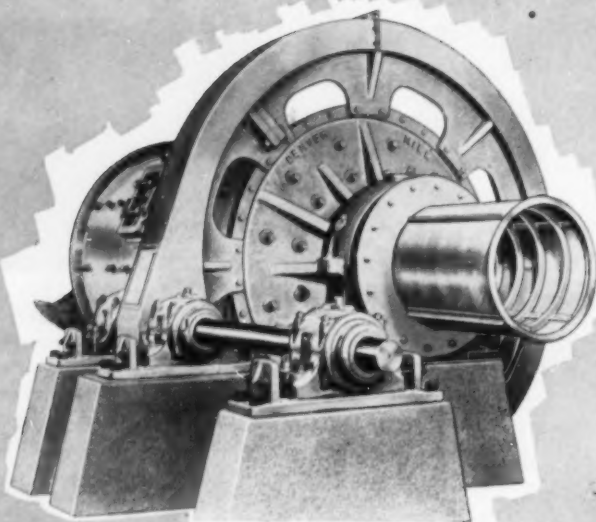


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Mining World

THE IMPORTANT MINING MAGAZINE EVERYWHERE

July 1956

INTERNATIONAL PANORAMA

WASHINGTON, D. C.—The United States Atomic Energy Commission has extended its domestic uranium procurement program through December 31, 1966. However, after March 31, 1962 no ore will be bought; only high grade concentrate at \$8.00 per pound of U₃O₈.

TORORO, UGANDA—A new company—Sukulu Mines Limited—has been formed by Uganda Development Corporation, Frobisher Ltd., and Olin Mathieson Chemical Corporation to mine and treat 420,000 annual tons of "carbonatite" to recover apatite and columbite.

NDOLA, NORTHERN RHODESIA—The Rhodesian Selection Trust group of companies is planning to bring the Chambishi copper mine into production. This will be the seventh "Copperbelt" mine.

BLACK LAKE, QUEBEC—Lake Asbestos of Quebec, Ltd., a subsidiary of the American Smelting and Refining Company, has awarded a \$7,700,000 contract for construction of a 5,000-ton-per-day asbestos ore milling plant at its Black Lake property 130 miles northeast of Montreal.

CASABLANCA, MOROCCO—Kirkland-Hudson Bay Gold Mining Company of Canada has purchased all of the shares of Compagnie Minière de Menizla, a French-Moroccan firm with metal mining concessions in southern Morocco.

BEDROCK, COLORADO—The nation's newest uranium mill is to be built here by the Atomic Fuel Extraction Corporation to process locally mined carnotite type ores. This is the 15th uranium mill operating or planned in the United States.

WASHINGTON, D. C.—The Office of Defense Mobilization has raised the nickel expansion goal from 380,000,000 to 440,000,000 pounds annually by 1961. ODM is also offering purchase contracts for producers expanding production.

CLIMAX, COLORADO—Climax Molybdenum Company is expanding its mill again by adding unit No. 17. It will increase overall recovery by 3.0 per cent with no increase in tonnage. The new No. 10 unit will start in August and raise daily tonnage by 3,800.

NEW YORK, NEW YORK—Consolidated Edison Company of New York Inc. has purchased 27,500 pounds of thorium from the AEC and applied to lease a sufficient amount of uranium 235 to enable work to start on a \$55,000,000 atomic power plant.

VIRGINIA, UNION OF SOUTH AFRICA—The Kennecott Copper Corporation has advanced an additional £1,500,000 to the Merriespruit (O. F. S.) Gold Mining Company Ltd. The money will be used to increase milling of gold-uranium-pyrite ore to 150,000 tons monthly, and for working capital.

GRAND JUNCTION, COLORADO—Minerals Engineering Company has signed a five-year contract with the London, England firm, Darby and Company, for sale of up to 5,000 units of tungsten per month from Mineral's new tungsten operation in Sonora, Mexico.

SUDBURY, ONTARIO—The M. A. Hanna Company has been investigating the feasibility of reopening the old Moose Mountain iron mine and building a new magnetic concentration plant.

SAN FRANCISCO, CALIFORNIA—Metal production in the Soviet Union in 1955 in metric tons is estimated as follows with 1938 figures in parenthesis: copper 390,000 (97,000); aluminum 560,000 (48,000); lead 460,000 (70,000); zinc 400,000 (70,000); and nickel 55,000 (35,000).

SALT LAKE CITY, UTAH—Mountain Copper Company, an English company, through its subsidiary San Francisco Chemical Company, has sold a one-half interest in its phosphate properties in Idaho, Wyoming, and Utah.

Government Will Aid Selenium Producers

Selenium has become the 34th mineral to be made eligible for government aid under the Defense Minerals Exploration Administration's plan. The government will advance up to 75 percent of the cost of any project to obtain the ore. At present, roughly 50 percent of the selenium used in the country is imported.

If the mineral deposits found are developed, the company which received the advance must repay the government at the rate of 5 percent of net sales. No requirement is placed on the explorer to develop the mineral, however, and no repayment is necessary if the metal is not mined.

Other minerals eligible for DMEA aid are: bauxite, chromium, copper, fluorspar, graphite (crucible flake), lead, molybdenum, zinc, cadmium, antimony, asbestos (chrysotile only), beryl, cobalt, columbium, corundum, industrial diamonds, kyanite, manganese, mercury, mica, monazite and rare earths, nickel, platinum-groups metals, quartz crystal (piezo-electric), rutile-brookite, tale (black steatite), tantalum, thorium, tin, tungsten, and uranium.

Southern Peru Copper Gets Fast Start on Big Project

Southern Peru Copper Corporation—a joint company owned by American Smelting and Refining Company, Cerro de Pasco Corporation, Phelps Dodge Corporation, and Newmont Mining Corporation—has awarded major contracts covering all phases of its \$200,000,000 copper project in southern Peru.

Foley Hermanos Ltd., Peruvian subsidiary of Foley Brothers Construction Company has made fast progress in building harbor and port installations at the small fishing village of Ilo. When Foley started work there wasn't even a wharf so all equipment was lightered ashore to use in building the dock which will permit berthing of ocean going vessels so that supplies and equipment can be unloaded. Foley is also leveling an area for initial warehouse construction.

Utah Construction Company and Morrison-Knudsen Company are joint venturing the construction of a concentrating mill, main service shops, a smelter, power plant, administration buildings, housing facilities, a transportation system, a highway network, transmission line, and port facilities at the coastal village of Ilo.

J. C. Stewart, of the Utah Construction Company's staff, will direct the Peruvian undertaking.

In August—Consolidated Coppermines' New Tripp Pit



MINE HEADINGS 22 by 14 feet in cross section are drilled out in half a shift or less by jumbo pictured above. The equip-

ment includes an International Harvester TD-9, hydraulically-controlled extension booms and Ingersoll-Rand drills.

Mi Vida: A Model Mine Grows Up At Site of Famous Uranium Find

By **STANLEY H. DAYTON**
Associate Editor

Underground uranium mining at Utex Exploration Company's highly mechanized Mi Vida mine in San Juan County, Utah, is best summed up by two words—impressive and efficient. The application of Diesel equipment has paid off with increased production and lowered costs. For instance, a mechanical drill jumbo bores 840 to 945 feet of hole in a drift heading in half a shift; tractor-mounted, front-end loaders clean up a 200 to 250-ton round in 3 hours; trucks, shuttling between mine headings and the surface stockpile, average 100 trips per two shift day hauling 9 to 10 tons of ore each time.

Since the 1952 disclosure of the deposit by Charlie Steen's now famous drill hole, the Mi Vida has prospered and grown to maturity. If the discovery of the ore body was a fabulous event, the subsequent develop-

ment and application of trackless equipment is no less remarkable.

Pay Own Way

Just for the record, let's have a look at what Utex has accomplished. Daily production now amounts to 900 to 1,000 tons. This is big enough to place the mine in a medium size category by present day standards. But, considering uranium alone, the Mi Vida is a major producer. Productive efficiency of underground personnel has bulged to 32 tons per man shift.

Probably more important, Utex reached this high level of production in the comparatively short span of 2½ years. They did it without government assistance or finances even though funds admittedly were short following the discovery. From the outset the company has paid its own way.

How has all this been achieved? First of all, it must be pointed out

that the ore body is big and the grade is good. There is little question about that. But progressive management must receive a good share of credit. If better methods for accomplishing a task are disclosed, company officials are quick to follow the new line.

Diesel-Minded

Almost from the start of actual mining operations, Diesel has been applied underground. However, on two separate occasions output per man nearly doubled or actually did double. First, a reorganization of the mining system in late 1953 and purchases of bigger machinery made it possible to double the size of development headings in ore for room and pillar mining. For example, substitution of mechanical drill jumbos for airlegs resulted in nearly a 7-fold increase in drill footage per drill shift.

Then a short time later, in mid-1954, the installation of a contract

labor payment system again almost doubled production per man. Realizing that the use of heavy machinery requires the development of specialized skills among the miners, the company has done everything possible to build a permanent, happy labor force. Living conditions at the property are excellent.

Big Ore Body

With the exception of Anaconda's Jackpile mine, the ore body underlying the holdings of the Utex Exploration Company is the biggest yet developed in this country. Some estimates have placed reserves at close to 1,500,000 tons. The deposit occurs in the Chinle formation, below the outcropping Wingate sandstones, and carries primary uranium as well as vanadium. Uranium mineralization is found in a gently dipping belt, nearly 700 feet wide, which extends for an undisclosed length.

The ore zone lies on the southwestern flank of the northwesterly trending Lisbon Valley anticline. The anticlinal flank is bisected by the east-west Steen Canyon, where the mine is located. The overlying Wingate formation has been eroded away to expose the Chinle formation near the head of the canyon. The deposit strikes north 30 degrees west and the dip follows quite closely that of the bedding which is 12 degrees to the southwest. The thickness varies from 10 to 35 feet.

Two Inclines

Access to underground workings is provided by the original discovery shaft, now used primarily for ventilation purposes, and two downward-dipping, inclined adits. The Rosalie Number 1 incline, driven some 200 feet to the ore horizon, is on a 19 percent grade. The Rosalie Number II incline is on a 10 percent grade. Koehring Dumpers haul all mine production through these two inclines. The vertical difference in elevation between the portal of the Number I incline and the ore is about 50 feet. The deposit is overlain by a maximum depth of 600 feet of ground.

On November 21, 1955, Utah Power and Light Company completed into the Big Indian District a power line that is now serving the Mi Vida Mine. Prior to that time electrical power was developed by Diesel electric sets at the mine. Voltage on the

Utex Looks Ahead to Fifth Year



CHARLES A. STEEN

July 4th is Independence Day, but how many of you know what July 6th is famous for?

Famous because it marks the discovery, by an independent geologist turned prospector, of one of the largest uranium deposits in the United States.

But even more famous in that this discovery made the United States independent of foreign sources of uranium. Not because of Mi Vida alone, but because it proved heretofore non-productive deeper-horizons to be ore-bearing, and it was the starter's gun for the greatest and most successful prospecting rush of the century.

July 6th marks the fourth anniversary of Charlie Steen's drill-hole discovery of the buried ore body. On July 3rd, near the center of the Mi Vida claim staked in 1951, the hole was started. On July 6, at a depth of 70 feet ore was hit. The hole continued in ore for 14 feet. Sinking of a shaft 30 feet southeast of the discovery hole began October 4, 1952. First ore was hoisted on December 4th, and ore shipments began on December 6, 1952.

It was this discovery which turned a penniless prospector into a uraniumaire. It could only happen in the United States where an individual could make a discovery, stake claims, and develop a mine while becoming famous and financially independent. Charlie Steen proved once again the importance of the prospector. The discovery proved in the best tradition that opportunity existed for a prospector, and it proved even more for the geologist and the uranium mining industry. Virtually all uranium production before the discovery came from relatively small, scattered, and irregular vanadium-uranium deposits in the Morrison formation. Charlie Steen found and proved that larger, more continuous, and higher grade uranium deposits existing in the older Chinle (Triassic) formation. It opened up an entire new uranium era. The deeper search for uranium.

Yes, it's true that other prospectors and geologists working in Colorado and New Mexico at the same time were making important discoveries and looking for uranium in many formations. Without Charlie's discovery the mining world, in time, would have found uranium in these formations.

But the important thing is that the Mi Vida was big, high grade, and its finding had all the elements of the greatest rags-to-riches success story ever dreamed or imagined since the days of the 49'ers.

On this anniversary MINING WORLD pays tribute to Charlie Steen. The accompanying report is of Mi Vida on its fourth birthday. Happy Birthday Charlie!!





FRONT END LOADER, an International Harvester TD-9 equipped with a Drott bucket attachment, loads a Koehring Dumptor at a typical underground heading. Total time required to clean up and haul away a 200 to 250 ton round is 3 hours.

line is 12,500 to the substation where transformers reduce it to 2,400. Mine voltages are 2,400, 440, and 110. The present power requirements of Mi Vida are approximately 400 kws.

Everyone is now probably thoroughly familiar with the background surrounding the development of the Mi Vida ore body. However, for purposes of comparison of mining then and now let's just review the record briefly.

The diamond drill which Charlie Steen used for drilling encountered a 14-foot thickness of ore about 70 feet below the surface in July, 1952. An 8 by 8-foot shaft was started the following October and the first shipment from the mine was made early in December 1952 from workings at the shaft.

Next, the G & G Mining Company obtained a lease on a 200-foot block of ground extending across the width of the Mi Vida claim. The lessee drove the Number 1 incline 10 by 10 feet in cross section, to the ore starting at a point about 400 feet south of the discovery shaft. The incline was collared in March 1954 and completed in May of the same year. Both Utex and G & G Mining Company used this entry to develop the ore, the operations both being carried on simultaneously.

12 by 12 Headings

The ore was mined using a room and pillar method; the remaining pillars were both 50 feet and 100 feet wide. Headings were driven about 12 feet wide by 12 feet high leaving ore in the back and bottom. Jacklegs were used to drill 5½-foot rounds in these drifts. According to USBM Informa-

tion Circular 7669, a drift round averaged 50 holes; two miners would finish this round in 5 or 6 hours using 6-foot lengths of Sandvik Coromant steel. Four miners were engaged in drilling ore.

Compare this with the present tractor mounted jumbo now used. Two men finish drilling a 22 by 14-foot heading with 11-foot lengths of steel in four hours. The 10½-foot round will break 220 to 250 tons. The 5½ feet of ground pulled with the former jackleg rounds broke about 60 tons; this is 160 to 190 tons less than can now be obtained with the same number of men in a slightly shorter time interval.

Overshot Loaders

In the early stages of mining, the ore was loaded with an International

Harvester TD-9 Loadover and hauled to the surface with a GMC truck which dumped the ore on a stockpile.

The G & G Mining Company used nearly an identical system but drift headings were more closely spaced. The lessee mucked the ore with a Cat HT-4 shovel loader; for haulage, a two wheel, rubber tired trailer (4-ton capacity) was drawn by a Caterpillar D-2. The G & G lease was terminated in February 1955.

Mine to Ventilation

The present method of working the deposit is roughly similar to the former methods employed but pillar width has been reduced, and the three primary operations—drilling, mucking, and haulage—have been refined to a high degree of efficiency. Drift headings now are driven 20 to 25 feet wide leaving a pillar of identical width between the drifts. The pillars are holed every 100 to 200 feet for ventilation purposes. The spacing of these holings is governed in large measure by the ventilation necessary for good working conditions and to dilute Diesel fumes. In this respect, underground uranium mining is similar to coal mining in that the mining pattern is controlled by the need for adequate fresh air.

Total drilling time requires approximately four hours in each heading. The drill jumbo, mounted on an International Harvester TD-9 tractor, includes two 3-inch Ingersoll Rand drifters which are chain fed from 12-foot feed shells. Each drill is installed on an 8-foot hydraulic boom which has a 5-foot telescopic extension. All hydraulic controls for positioning the booms and the air and feed throttles for the drills are mounted on the



AT TOP of ore stockpile near the inclined haulage ways, a Koehring truck dumps a load of ore. A Caterpillar Traxcavator, working at the toe of the stockpile, reclaims the muck and loads a contractor's truck for shipment to a buying station.

tractor. Two of these units handle all the required drilling at the mine.

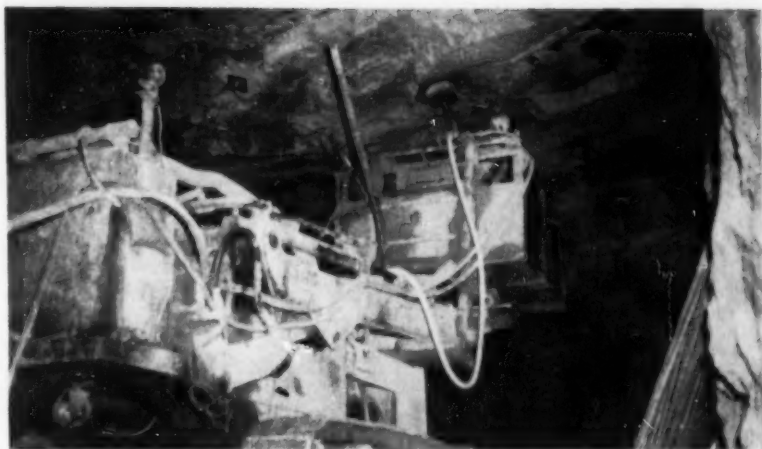
Double Wedge Cut

The holes are drilled with 11-foot lengths of hexagonal drill steel using detachable Sandvik Coromant tungsten carbide bits. The footage per bit has averaged about 1,500 feet. The completed round will total 80 to 90 holes in a 22 by 14-foot heading. The rock breaks to a vertical slot established by drilling a series of horizontal, double wedge cuts. The two rows of holes for the outside wedge are collared about 70 to 80 inches apart, and are drilled with the 11-foot steel. The baby wedge holes, placed inside and below each set of 11-foot V-cuts, are spaced about 51 inches apart. These holes are drilled so that they intersect at a depth of 4 feet. Drilled in this manner, the entire round will pull about 10% feet of ground.

Blasting is done with du Pont extra A dynamite, which comes in 1½ by 24-inch cartridges. The cut, lifters, back and breast holes in the heading are fired electrically with millisecond delays. It requires almost two man-hours to load this round.

Mine to 25 Feet High

The back is probed for ore periodically with 8-foot drill holes to determine if extraction has been complete. The maximum height of mining is 18 feet. This is limited primarily by the jumbos now in use since the reach of each boom above the top of the tractor is only 15 feet. Where ore occurs in thicknesses above 25 feet, the area is mined in two lifts. The top section is advanced in a single slice after which the bottom is taken



ROCKBOLTING in high headings is done from platform mounted on a Bucyrus-Erie loader which has been reconvered for the job. CF & I bolts are placed by two man crew. Height and tilt of working platform is adjustable.

up. Certain sections of the deposit are nearly 35 feet thick.

Now Use Front End Loaders

To muck out a heading 22 feet wide by 14 feet high, in which a 10%-foot round has been broken, will require about 3 hours. This means that between 200 and 250 tons of ore must be loaded and hauled to the surface. Diesel-powered front-end loaders are used for mucking the round. Several different types are in use which include: an International Harvester TD-9 with a Drott bucket attachment, an Allis Chalmers Tractor-Shovel (bucket mounted on HD-5 chassis) and the Caterpillar Traxcavator. In addition, two other front-end loaders are in service at the dump where stockpiled ore is loaded on the contractor's trucks for shipment to the AEC buying station at Moab, Utah.

With a 22-foot heading there is just enough room for the front end loader and Koehring Dumptor to work side by side. The payload carried by each dumptor varies between 8 and 10 tons. At the present time it requires about six minutes, under optimum conditions, for the Dumptor to make a round trip from the working face to the stockpile and back to the working face. Utex Exploration has three dumptors at the mine; two are in service and a third on standby duty. The big advantage of the Dumptor is that it is fast and highly maneuverable. The truck operates at three speeds either forward or backwards and dumps by gravity. The total distance involved in making a round trip is about 2,800 feet. The 19 percent Number 1 incline is the maximum grade that is traveled during the haul.

Rockbolting

Rockbolts are used for support of the back between pillars. In some cases where permanent underground installations of machinery are made, the sides of pillars are rock bolted. In most cases a heading is advanced two rounds and mucked before the roof bolting crew moves in. Roofbolts are placed in a staggered pattern on 3 to 5-foot centers. As a rule this means about 1½ bolts per foot of advance.

For roofbolting purposes a former Bucyrus Erie dozer-shovel has been refitted with two sets of booms supporting a platform. The booms are hydraulically controlled from the operator's seat in the converted shovel. The platform can be elevated to a total height of 23 feet above the bottom of the drift. One set of booms



KOEHRING DUMPTORS shuttle between underground working faces and the surface stockpile with 10-ton payloads. This truck is emerging from the collar of Rosalie No. II, a 10 percent incline. Time required for round trip is about 6 minutes.



ORIGINAL DISCOVERY SHAFT is a monument to the past. Now used for ventilation only, the shaft ultimately led to development of one of the nation's biggest uranium deposits when ore was encountered near the 70-foot horizon.

provides the lift for the roof-bolting platform, and the other set controls the tilt of the basket so that the platform can always be leveled at any height. A two-man crew will place about thirty, 6-foot roof-bolts per shift. Colorado Fuel and Iron Works rock bolts (wedge type) are used throughout the mine. Surplus landing mats are more popular than headboards for lacing backs.

Exhaust Scrubbers

All of the Diesel equipment is fitted with water scrubbers on the exhaust. State law decrees that 75 cubic feet of free air must be furnished for every brake horsepower rating of the Diesel equipment. At the original discovery shaft a Joy axivane fan furnishes 110,000 cubic feet per minute to the mine. Joy series 1000 auxiliary blowers furnish air to every dead heading to eliminate Diesel fumes. Mine ventilation is controlled by doors and bulkheads. The Mi Vida mine is interconnected with Standard Uranium workings and, of course, is opened by two inclined adits.

Growth

How is the grade controlled? The faces are sampled vertically and a

grab sample is taken from each Dumptor load. Quick radiometric assays are used to control daily activities; however, each sample is checked by chemical methods for positive results and overall planning. The Radiometric analysis of each shipment to a buying station is known two days after the load has been shipped.

The growth of the Mi Vida mine since the mid-1953 period has been recorded in two definite series of production jumps. The first jump occurred in the four-month period beginning in November 1953 to the end of February 1954. Production per man shift nearly doubled through a reorganization of the mining system and purchases of the equipment now used. This was accomplished by changing from overshot loaders to the front end loaders now employed; by adding another Dumptor to the haulage cycle; and, probably most important, switching from airlegs to mechanical jumbos which permitted an increase in the size of the headings. The change in drilling technique made it possible to change to longer steel. With the jumbo, spotting of holes is more precise and overbreak can be reduced.

In the period from May 1954 through September 1954 production

per man shift nearly doubled again when a contract system was installed.

Production

Each shift the 15-man underground crew will mine and haul about 500 tons. Production per man shift for underground personnel averaged 32.18 during July 1955 and in August averaged 32.68 tons. For the entire payroll, excepting salaried personnel, production per man shift was about 17 tons. This includes all surface employees consisting of electricians, motor patrol operators (Utex maintains the haul road to the bottom of the canyon, a distance of 9 miles), mechanics, truck drivers, construction workers, office workers, and those employed at the stockpile in loading trucks for shipment.

Specialization

One of the big factors in the success of the mine has been a steady, well trained crew. Specialization is the policy at the mine, but the crews are adaptable and can replace one another at specific tasks. Each miner is broken in on each of the various jobs; however, his activities for the most part are confined to either drilling, rockbolting, mucking or haulage. When asked how long it takes to train a Dumptor operator, mine superintendent Virgil Bilyeu replied "about two weeks." A longer period is required to train a driller. Usually the Dumptor operators and jumbo men are rotated periodically. Prime reason is that truck driving is harder on the men.

Co-ordination of Work

It takes close supervision to schedule daily activities and a steady crew is essential. The shifter records the day's work in a log kept in the mine office. The faces which are open, the faces which are being mucked, the location of equipment, and daily rock bolting activities are recorded. The on-coming shift by studying the log can then organize work accordingly.

Present air power requirements are met with two Ingersoll Rand Gyroflo 600 compressors. Two new 900 cubic-foot compressors will be installed underground in the near future, however. This is in line with a general move to consolidate as many activities as possible underground. Shop facilities will be moved under-

ground so that all but major repair jobs can be handled without bringing equipment to the surface. Electric power for the compressor and for shop machinery will be brought into the mine through an 8-inch borehole from the surface.

Footwall Development

Further south from the two incline entries, an 11- by 11-foot adit has been collared in the Wingate formation which will crosscut under the ore at a depth of 70 feet. This adit will branch northwest and southeast following the strike of the deposit. The lower level will ultimately serve as a train haulageway and an entry way from which development can be carried out to recover ore left in the pillars. Ore bins are presently under construction at the new site and all mine production will be trammed to the surface by train.

Gismo Mucking

The lower level had advanced some 700 feet at the time of MINING WORLD's visit. When completed it will be over 1,700 feet long. One interesting fact worth mentioning is that the first low head tunneling Gismo has been employed at the lower tunnel. This unit will work with a string of specially designed three-compartment, bottom dump mine cars made by Sanford Day Iron Works as soon as bins are completed and the track laid. The cars will operate on a 48 inch gauge track. The top of each car is fitted with a pair of steel shelves which extend the full length of the car. When the cars are coupled in a train, the shelves form a continuous track broken only by a short 10-inch gap between cars. The Gismo, after gathering a load at the face, backs up a few feet, travels up a ramp, and over the string of cars. The load is dumped in the car furthest from the face until the entire train is loaded. This lower level will not be tracked, however, until the ore bins are completed and the Gismo presently trams each load to the portal and spreads it on a dump.

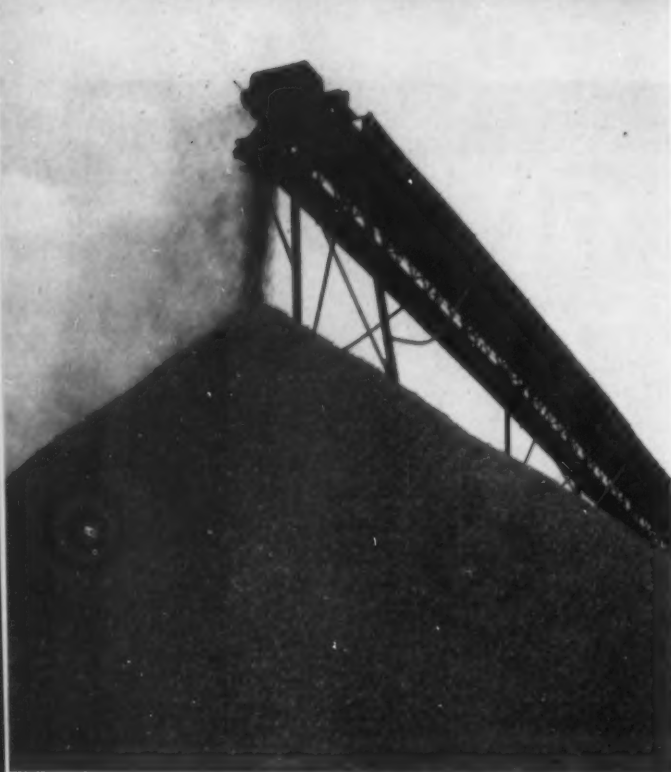
The application of Diesel equipment at the Mi Vida has paid off by cutting costs and improving overall efficiency. Utex, now a leading uranium producer, is certainly an important factor in the supply of raw material for atomic energy purposes.



PILLARS AND BACKS are quite often laced with surplus landing mats which proved more popular than the use of headboards with individual rockbolts. Mine foreman Hall Thorne inspects an installation near the underground shops.



AIRCONDITIONED BUNKHOUSE, constructed of concrete blocks, is furnished for single employees living at the Mi Vida mine. Conditions such as this helped to make it possible for the company to build a stable, permanent group of workers.



STACKING CONVEYOR delivers ore from Austin-Western mobile crushing plant to storage area on ground. Feed is reclaimed through tunnel and conveyed to beneficiating plant.

Domestic manganese production in the Southwest hasn't died entirely, because two hardy, independent producers with HMS plants near Socorro, New Mexico are making ends meet under the nation-wide car lot program sponsored by the Federal government. Manganese Corporation of Arizona, 6 miles south of Socorro, is treating 2,000 tons of ore per day by heavy media separation, jigging and tabling from which 1% car loads of concentrates are obtained. Tower Mining Company, 4 miles west of Socorro, has a similar 1,500 ton-per-day plant, and also an interesting sintering installation for volatilizing lead impurities from manganese concentrate.

When manganese quotas were filled at the Deming, New Mexico and Wendon, Arizona purchase depots, production in the southwest was reduced to a mere trickle. The reason was obvious. Under the strategic mineral purchase program of 1952, pricing schedules were established for ores containing 15 percent or more manganese. Depos-

U.S. Manganese Still a Spark In New Mexico

its were low grade, small, and scattered, but hundreds of operators formerly could ship directly to a purchase depot after washing or jigging the ore.

To participate in the car lot program, now the only support program in which the New Mexico or Arizona producer can participate, he must meet more rigid specifications. Only a handful of producers had ore reserves large enough to justify the expenditure required for a treatment plant necessary to produce a plus 40 percent manganese concentrate. The minimum specifications which must be met under the car lot program are set forth in Table I.

Both Tower and Manganese Corporation of Arizona control extensive deposits containing a "free milling" black manganese oxide. Tower Mining Company handles ore on a custom basis as well as treating ore from the company's own deposits. Manganese Corporation keeps busy milling its own ore. These two plants are about the only spark remaining in the manganese district near Socorro.

MCA Can Mine and Mill 2,000 Tons Per Day

Manganese Corporation of Arizona has two open pits which are being rushed into production. Mill feed for the present is now being furnished from a large stockpile of low-grade ore material which was sorted and rejected by former operators of the property who shut down when the two southwestern purchase depots closed.

At the State Lease open pit, \$1,-500,000 worth of manganese ore has been extracted. Reserves in this section alone are said to total 18,000,000

long tons of 4½ percent manganese ore. To the north and just across the hill, another open pit has been opened on a block of ore which totals 1,500,-000 long tons though this area has by no means been thoroughly delineated by drilling, possibilities of proving more ore are good. The big complicating factor at the latter pit is that it is overlain by overburden at one end which varies from 40 to 70 feet thick. The chief ore mineral is psilomelane, a manganese oxide, which occurs in rhyolite country rock along

with scattered occurrences of calcite, a replacement mineral. The deposit occurs along a shear zone which shows a north-south trend. From a milling standpoint, the best ore occurs where the rhyolite has been altered because the decomposition results in a free milling ore which is easily treated in the HMS plant.

To Study Jet Piercing

Mining was contracted formerly, but Manganese Corporation of Arizona is now gradually undertaking this job. The drilling is still contracted, however, to McBee Drilling Company of Deming, New Mexico. This com-

pany is using Bucyrus Erie 24-L and 22-W churn drills and these rigs are putting down 6-inch blast holes. Worn bits are built up by hard facing with Stoody Company rods to rebuild gauge diameter and prolong bit life. The ground is extremely ravelly and this naturally increases the drilling problem. To obtain the best breakage, holes must be sprung, and this must be done with extreme care in the ravelly ground to avoid losing the hole. With these complicating factors in mind, Manganese Corporation of Arizona is investigating jet piercing in an effort to combat this problem. The holes are loaded with Illinois Powder Company (Gold Medal) 60 percent bag powder, and blasted using primacord and millisecond connectors to time the round.

Trommel Upgrades Ore

Until the open pits are ready to produce, mill feed is reclaimed from the low-grade stockpile by two Diesel-powered shovels, a Lima 1½-yard machine and a Marion ¾-yard excavator.

The bucket teeth are subject to rather severe abrasion, so the company is using Coated Tube Stoodite, applied by arc. This is a high alloy hardfacing material made by Stoody Company which is doing a very good job. The shovels load a fleet of GMC trucks capable of transporting 10-ton payloads. This ore is trucked ½ mile to a trommel located approximately midway between the two open pits. The trommel actually mechanically sorts the feed by making a split at 3½ inches. The undersize contains most of the readily recoverable manganese occurring in the ore. The large fragments discharged from the trommel contain little manganese, and the elimination of this fraction from the ore increases the grade of that shipped to the mill by nearly 30 percent. A six percent ore will assay eight percent manganese after the split. The waste from the trommel is bulldozed to a dump by a 200-horsepower, International Harvester TD 24. The undersize from the trommel is gathered on a short conveyor which feeds a 25-ton hopper. Diamond T trucks, which have a total load carrying capacity of 16 tons, draw ore from this hopper and haul the material to the mill 2 miles away.

Mobile Crushing Plant

At the all-gravity separation plant, the free-milling ore is beneficiated into a specification-meeting, plus-40-percent concentrate at the rate of about 1½ railroad car loads of concentrate per day. Troublesome sulphide



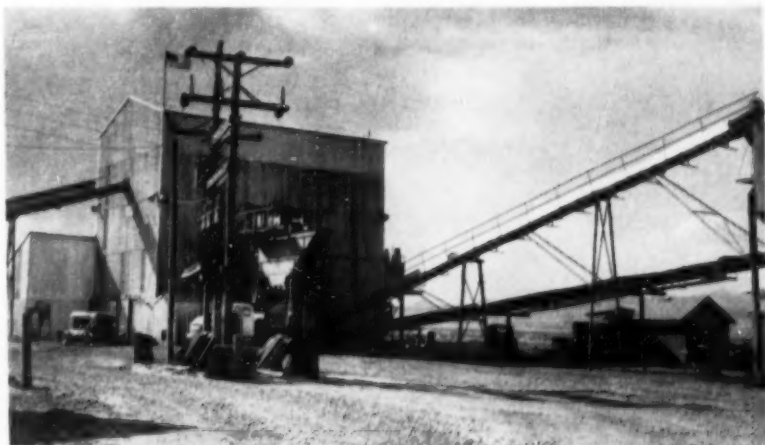
BLAST at State Lease open pit south of Socorro includes 27 churn drill holes.



WORN CHURN BITS are rebuilt with Stoody Co. rods to improve bit life.



MOBILE CRUSHING PLANT works 16 hours per day, seven days a week at the mill. The Austin Western unit contains a jaw crusher, a set of rolls and three screens.



CRUSHED ORE is delivered to MCA mill by conveyor at left. At the right, the upper conveyor handles concentrates, and the lower one the mill middling product.

impurities are absent from the ore so recourse to sintering practices is unnecessary. The alumina and the silicate content of the feed are the impurities which must be watched most closely. Specification limit of this material is not more than a combined alumina-silica content greater than 15 percent. The gravity concentrate from the MCA mill ranges between 11 and 14 percent in these constituents. Over-all recovery of manganese varies from 55 to 60 percent.

Ore trucks from the mine dump their payloads into a 25-ton receiving hopper at the plant site. The crushing installation is a simple, compact, package unit designed specifically for contractors in preparation of aggregate for road building or other construction jobs. The Austin-Western mobile plant contains a jaw crusher, a set of rolls, and three screens. The feed is crushed to minus 1½ inches in size with the oversize fractions being recycled within the mobile crushing unit. A stacking conveyor gathers the product discharged from the Austin-Western installation and delivers the feed to a storage area on the ground which provides a 10,000-ton surge capacity between mine and concentrator.

Reclaiming Tunnel

Ore is reclaimed from the surge pile through a tunnel and conveyed by belt to the top of the mill building where it is discharged to an Allis-Chalmers 6- by 16-foot, double-deck, vibrating screen. The three size fractions produced by this screen are treated separately. The plus ¾-inch portion is treated in a Wemco Number 3 HMS Mobil-Mill consisting of

two 10-foot diameter HMS cones arranged in series, along with washing screens, a magnetic separator, and a spiral classifier for reclaiming ferro-silicon media. This circuit was the basic unit around which subsequent installations were made of jigs and tables to improve the recovery of manganese occurring in fine feed which was not amenable to HMS.

The oversize from the second deck of the 6- by 16-foot vibrating screen, the minus-¾, plus-½-inch fraction, is concentrated in Pan American jigs. The third split, the minus-½-inch undersize, is piped to a Wemco spiral classifier where the pulp is dewatered and then fed in parallel to eight Wilfley shaking tables. The overflow from the dewatering spiral is de-slimed in a Duraclone, made by the H. B. Large Company, and the cyclone underflow joins the feed to the tables.

How Middling Is Handled

The HMS concentrate averages 45 percent manganese, the table concentrate will assay 44 percent manganese, and the hutch product from the jigs will grade 48 percent manganese. Actual recovery is more efficient in the HMS and jig circuits since approximately 80 percent of the manganese in the feed to these two sections is reclaimed in concentrates.

The plus-¾-inch feed entering the first of the two 10-foot-diameter HMS cones is processed using a low density media. Maximum recovery is obtained by maintaining specific gravity in this cone at 2.70. The sink product from this vessel is then cleaned in the second cone where a media density of 3.40 is maintained. The float from the first cone is sized in a screening plant

and stockpiled for sale as road ballast since the rhyolite gangue has excellent load-bearing characteristics. The float from the second cone in the series contains approximately 28 percent manganese and is conveyed to a wooden bin. A feeder under the bin removes the sub-specification-grade product and discharges it to a roll crusher where it is reduced to ¾ inch in size. After it is crushed this material can be handled in either of two ways. First, it can be trucked back to the 10,000-ton surge pile and recycled through the mill again; or second, a portion can be blended with the high-grade concentrates for shipment to the government stockpile.

Both the sink and the float products of each separatory cone are fed to Allis-Chalmers vibrating screens fitted with Wedge Wire decks for washing and media drainage. The drained media is recovered by magnetic separators, dewatered by spirals, and returned to the circuit. Make-up ferrosilicon amounts to 0.25 pounds per ton of mill feed. A small amount of magnetite is used to impart the proper viscosity characteristics to the media. Total consumption of magnetite will amount to about 200 pounds per week.

Jig Circuit

The jig circuit is composed of three Pan American machines, each contain two 24- by 24-inch cells. The feed to this installation is divided among the three machines, and the pulp overflowing the weirs in the first compartment reports to the second cell in each machine. One-quarter-inch steel shot is used to make the jig bed. The hutch products from the jigs commonly contain up to 48 percent manganese. The overflow is sluiced to a waste disposal area in an arroya near the mill.

Minus-½-inch particles scalped from the mill feed by screening are dewatered by a Wemco screw classifier and this material is introduced to a distributor which splits the pulp among eight Wilfley tables. Each table makes a 44 percent concentrate and a 17 percent middling product. The middling is further cleaned in a Bendalari jig making a 46 percent manganese concentrate.

The high-grade concentrates from the jig circuit, from the HMS cones, and from the tables join at a conveyor and are discharged to a 100-ton-capacity steel bin. Trucks transfer the specification grade concentrates to a railroad loading point for shipment.

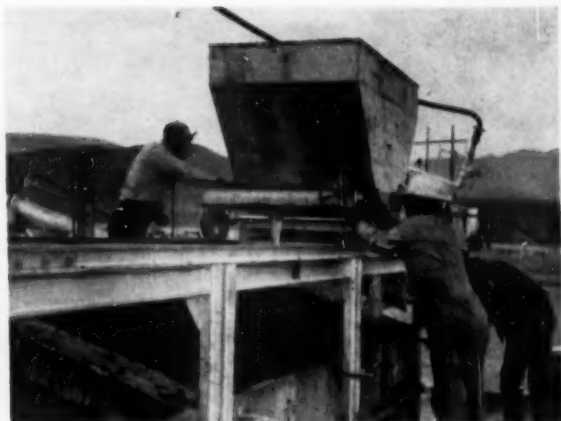
Water for the milling operation is furnished from two wells and pumped under a 550-foot head to the concentrator.



AT THE MINE trucks transport ore to bin at upper left which feeds the trommel. The minus ¾-inch undersize is gathered on the conveyor and discharged to the 25-ton hopper. Diamond T trucks haul the ore 2 miles to the mill.



CHLORIDE ROAST on Mace sintering hearth reduces lead in manganese concentrate to specification limits at Tower.



CHARGE CAR traveling on tracks over the downdraft hearth loads manganese concentrate in each furnace compartment.

Lead Removal: A Problem at Tower Mining

Tower Mining Company has purchased and is testing a Mace, four-hearth type XZ, sintering grate in order to eliminate lead-zinc-copper impurities from the manganese concentrates produced in its 1,500-ton-per-day mill. The beneficiated product from the HMS plant contains approximately 2.56 percent lead, 0.18 percent zinc, and 0.01 to 0.02 percent copper—all in sulphide form. This adds up to a base metal content of 2.75 percent which is well over the allowable limit set forth in the specifications. Essentially the process consists of sintering the manganese concentrate with a charge consisting of salt, coke breeze, and sawdust. The lead is volatilized as a chloride and vented to the atmosphere.

Charge Composition

The company can crowd up to 1,500 tons per day of free milling manganese ore through the mill which is built around a Number 2 Mobile Mill containing a 7-foot sink-float cone. The sink product is crushed to minus 1/2-inch in a set of rolls and a hammermill, and delivered to one of the four bins serving the sintering plant. The other charge ingredients are stored in the other three bins. A common gathering belt below the bins is fed by a series of Syntrol vibrating feeders which draw material from each of the bins. The oscillations of the feeders, and thus the quantity of any product fed to the gathering belt, can be varied from central panels through a rheostat control. Each product is metered to the belt to make a charge composition of 70 percent manganese concentrate, 15 percent coke breeze, 10 percent salt (NaCl), and 5 percent sawdust.

The layered charge on the conveyor

belt is fed with a small amount of water to a Mace pug mill mixer to blend the charge thoroughly. A belt conveyor elevates the charge to a bin serving the sintering hearth.

Downdraft Sintering

The sintering hearth contains four 4- by 5-foot compartments enclosed with air-cooled, cast-iron liners. The process is dependent on down-draft sintering. Two suction boxes below the grates each serve a pair of compartments and are connected to two air manifolds and high exhaust vacuum fans driven by 30-horsepower motors. The duty of each fan at an elevation of 4,800 feet is 9,000 cubic feet per minute at 300° Fahrenheit. This is equivalent to 4,500 cubic feet per minute per compartment or 225 cubic feet per square foot of hearth area. The nominal capacity of the sintering hearth per 24 hours is 75 to 90 tons.

A charging car and a wheel-mounted hood containing six burners which are fired by natural gas travel along a set of tracks above the grates. The charging car is loaded from the bin and moved along the track discharging material to each compart-

ment. The total depth of the bed on the grates is 12 to 15 inches thick after the furnace is loaded. When the hearth has been loaded and raked smooth, the charging car is backed up to a position under the bin and the burner hood or igniter car is placed in position above one compartment. The muffle on the igniter carriage is adjusted so that it just clears the surface of the charge. The suction from the fan snaps the flame down to the surface of the bed and ignites the coke breeze which maintains the combustions. The carriage is moved to the next compartment and so on down the line. In the oxidizing atmosphere of the sintering operation with its great excess of air volume, the lead is volatilized as a chloride. The sawdust in the charge is necessary to maintain a porous bed for down-draft sintering. When fusion reaches the grates, the fans are shut off, and the cake is discharged from the inclined grates by a pneumatic plunger which travels along a track behind the furnace.

The unit is still undergoing tests to determine optimum operating conditions. With a plus-40-percent manganese concentrate containing 2.75 percent combined copper-lead-zinc as set forth earlier, the sinter has been reduced to a combined analysis of 1.33 percent of these elements. In a subsequent re-run of this same sinter, the content of lead-copper-zinc was further cut to 0.38 percent which is well below the government specifications. Test work is still proceeding, and it is entirely possible that further refinements in charge composition or furnace operation will make it possible to bring the sinter down to specification limits in one pass. If this does not prove possible, it will be possible to bleed off a certain amount of sinter from the first burning process for a return ignition and then blend the two lots.

Table I

Specifications For Domestic Manganese Purchase Program

Manganese	40 per cent minimum
Iron	16 percent maximum
Phosphorus	0.30 percent maximum
Lead plus copper plus zinc	1.0 percent maximum
Silica plus alumina	15 percent ¹
Termination	June 30, 1958 or 19,000,000-long-ton units
Base Price per long-ton unit	\$2.30 for 48 percent Mn ore

¹. Actually no limit is specified, but ore over 15 percent is purchased in exceptional cases only.



WEST LYEEL OPEN PIT is the only mine now operated by Mount Lyell Mining and Railway Company, Ltd. The low-grade ore reserves of the pit average only 0.7 percent copper. Mount Lyell is the largest metal mine in Australia.



CHURN DRILLING blast holes at West Lyell pit. Seven drills are used for the 20 45-foot ore holes shot weekly.

How Australia's Largest Mine Treats Lowest Grade Copper at Mount Lyell

By LEO A. LYONS

In far-off Tasmania is a mine of which Australia is justly proud—a mine that has been in operation for over 60 years and is expected to continue for at least another 60. This mine with its supporting flotation plant and copper smelter is operated by the Mount Lyell Mining and Railway Company, Ltd.

Successfully working ore assaying 0.7 percent copper, and even less, it is easily one of the world's lowest grade producers and serves as a model for any mine, anywhere. For example, during the whole three-month period ended 30th June, 1955, feed to the concentrator AVERAGED 0.534 percent copper.* Just prior to my recent visit, ore delivered to the mill for a complete week assayed only 0.353 percent copper—the lowest week on record.

Summarized, here are the reasons for the Mount Lyell Company's success:

- Courage and foresight.
- Best utilization of favorable natural factors.

Mr. Lyons is Smelter Superintendent at the Electrolytic Refining & Smelting Company of Australia Pty., Ltd., Port Kembla, New South Wales, Australia.

- Large-scale mechanized mining on the United States pattern.
- An effective flotation concentrator.
- Specially adapted smelting and refining techniques.

History

The full story of Mt. Lyell's discovery and development has recently been published.**

Discovered in 1883, the original outcrop, like so many others, was first worked as a gold mine. The present company was formed in 1893 and progressively absorbed others on the

field. Copper smelting commenced in 1896 and, from the outset, attracted worldwide attention as the original and most nearly ideal example of large-scale pyritic smelting. The process was introduced by an American whose name is still a household word at Mount Lyell: Robert C. Sticht, for years its general manager.

Geology

Basement rocks are sandstones, limestones, and slates of probable Ordovician age overlain by some thousands of feet of Silurian conglomerates. The sediments were intruded by porphyries which, in the vicinity of Mount Lyell, were later altered to schists. The ore bodies are mainly impregnations of chalcopryite and pyrite in well foliated schist at or near the point of contact with conglomerates.

The principal orebody, West Lyell, is a deposit of schist 1,200 yards long

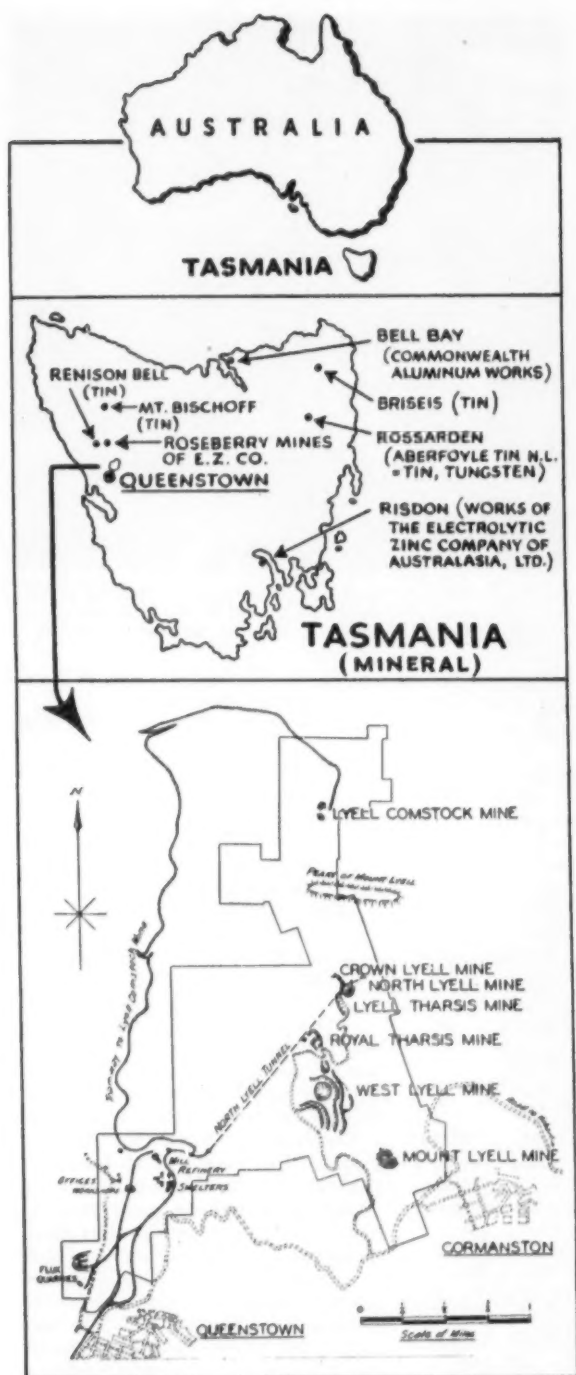


LEO A. LYONS

* The lowest three-month period occurred during 1950. Details were as follows: Ore treated, 355,676 tons; average grade, 0.494 percent Cu; concentrate grade, 23.40 percent Cu; tailing assay, 0.099 percent Cu; ratio of concentration 58.99 to 1.0; and recovery, 80.31 percent.

The company points out that profitable mining operations were not possible under the above conditions with copper prices then prevailing.

** *The Peaks of Lyell*, Geoffrey Blainey. Published by Melbourne University Press, 1954. (New York and London: Cambridge University Press.)



MOUNT LYEEL mines and associated plants.

by 600 yards wide containing disseminated pyrite (10 percent) chalcopyrite (1.8 percent; i.e. 0.6 Cu) and minor amounts of other copper minerals. There are no definite walls to the deposit but its extent has been defined by close diamond drilling. The rock is hard and much jointed, making fragmentation difficult.

The feature of greatest importance is, naturally, grade and extent of the ore bodies. Details are shown in Table No. I.

West Lyell is an open cut. Others, except North Lyell open cut, are underground mines. Due to shortage of miners, only West Lyell is worked, so that reserves are virtually 41,500,000

tons at 0.7 percent copper. This is not a company that "takes everything down to 0.7 percent." It averages 0.7 percent copper.

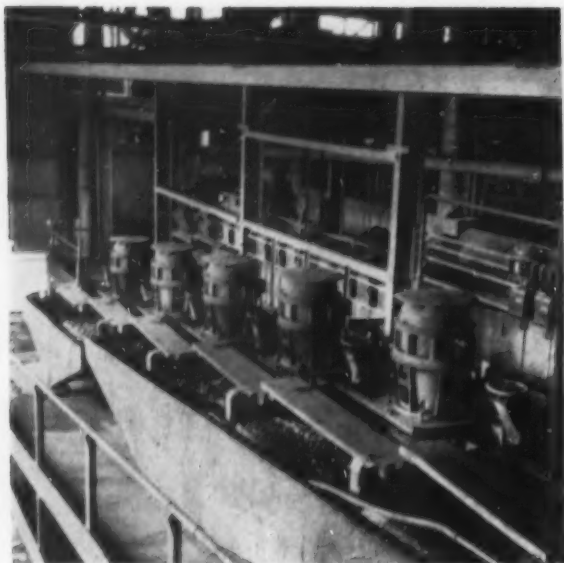
It is known that further very large blocks of ore exist at depths too deep for open pitting with copper content up to 1.0 percent. These have not yet been measured and are therefore not included in reserves.



HARD AND MUCH JOINTED ore makes fragmentation by primary blasting difficult so that much secondary blasting is necessary. Here two drillers are at work on the big, rough, muck pile from a primary blast.



TWO ELECTRIC SHOVELS at work in the West Lyell pit. Note the large size of the ore being loaded by the nearest shovel. This is possible because primary crusher opening is 60 by 84 inches.



FLOTATION machines are pneumatic and mechanical. Pictured here is a bank of mechanical cells in the pyrite rougher circuit. Forrester pneumatic cells have been very satisfactory.

Ratio of present ore to overburden is 1.0 to 1.0.

The company has always been prepared to adjust its policy and techniques to meet changing circumstances. From the earliest years it has operated a railway and, since 1914, has possessed its own hydro electric power plant.

Location, Economic Factors

The mines concentrator and smelter are at Queenstown in Tasmania's isolated west coast district. There would be little or no population but for the Lyell Co.'s activities which support a community and satellite settlements of 5,000.

Although not a particularly cold climate, it is very wet. The open cut receives 125 inches of rain annually, and the power station, a few miles away, 150 inches. Rain falls on more than half the days in the year, making working conditions difficult.

The company makes best possible use of local high rainfall by operating a hydroelectric power station with a peak capacity of 11,500 horsepower.

Table No. I
Ore Reserves at Mount Lyell Mining and Railway Co. Ltd., Queenstown, Tasmania, 1955

Ore Body	Tons	Percent Copper	Ounces Silver	Per Ton Gold
West Lyell	41,542,000	0.70	0.045	0.008
Royal Tharsis	954,000	1.60	0.080	0.016
Lyell Tharsis	800,000	1.00	0.150	0.010
Crown Lyell	190,000	1.50	0.250	0.015
North Lyell ¹	3,000	3.60	0.350	0.010
North Lyell ²	2,500,000	0.80	0.350	0.010
	45,989,000	0.73	0.064	0.005

1. Underground. 2. Open pit.



PYRITIC SMELTING started in 1896 and attracted world-wide attention as the original and most nearly ideal example of large-scale pyritic smelting. Pictured are the converters.

The station has a water catchment area of only eight square miles! Generation capacity is now inadequate, about one-third of total power consumption being purchased from the Tasmanian Government Hydro Electric Commission.

Table No. II
Copper Flotation Results at Mount Lyell Mining and Railway Co., Ltd., Queenstown, Tasmania from 1953 through 1955

Item	1955	1954	1953
Tons of ore	1,603,100	1,575,200	1,472,100
Percent Cu in feed	0.655	0.711	0.602
Percent Cu in concentrate	23.70	24.17	24.80
Percent Cu in tailing	0.107	0.119	0.102
Copper recovery, percent	84.05	83.64	83.34
Gold recovery, percent	51.45	46.12	47.11
Ratio of concentration	43.06	40.63	49.47
Tons copper output	8,825	9,372	7,381

The maintenance of a 22-mile railway to Strahan, coastal outlet for pyrite and most of the company's copper, is a heavy burden. The railway passes through very difficult country and part of it is on the Abt system. Recently purchased Diesel locomotives now haul 150-ton loads on the lower half of the line.

Mining Practice

Two shifts are worked in the open pit five days per week.

The mine is fully mechanized to handle 1,500,000 tons of ore per year, plus overburden. Capacity is being increased to 2,000,000 tons of ore. Major equipment is as follows:

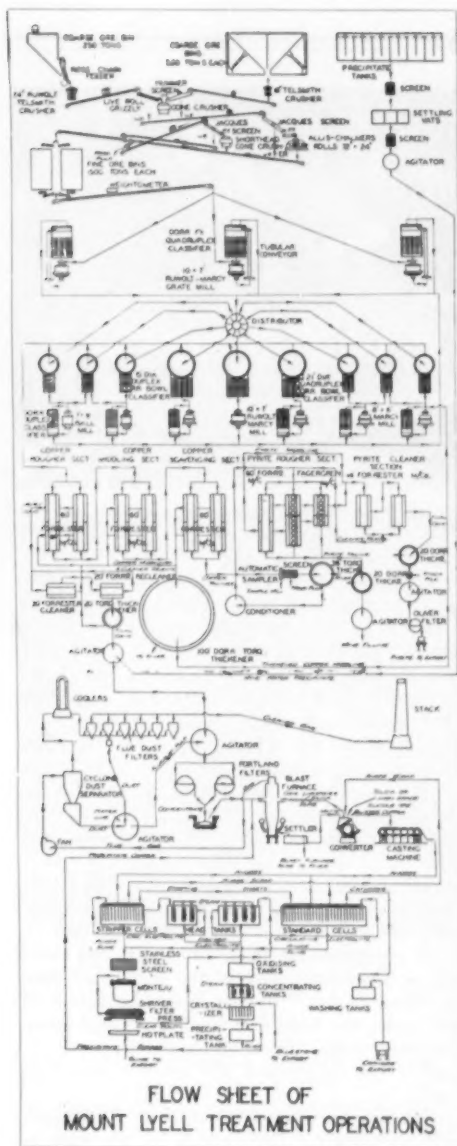
- Five 5-cubic-yard Ruston-Bucyrus electric shovels.
- Twenty-two 20-ton end-dumping Euclid Diesel Trucks.
- Seven caterpillar track-mounted Bucyrus-Erie 9-inch churn drills.
- Five Allis-Chalmers HD-15 tractors.
- Two Tournadozers.
- Seven Broomwade portable compressors.
- Thirty-two runabout vehicles.
- One tractor-mounted 15-ton Le Tourneau crane.
- One 4-ton mobile crane.

A large, fully equipped, steel-framed workshop is situated in the mine to permit immediate and complete maintenance to all equipment.

Benchies in the pit now have a standard face height of 45 feet, conforming with the cleaning capacity of shovels used without resort to manual labor. For blasting, the churn drills, using straight carbon steel, drill to a depth of 45 feet. Drill sludge is sampled with organ-pipe splitters to determine ore grade ahead. The bottom 15 feet of drill holes is filled with 8-inch plugs of "Quarigel" explosive. Non-gelatinous powder cannot be used owing to the wet conditions normally encountered. Electric detona-

Table No. III
Pyrite Flotation Results at Mount Lyell Mining and Railway Co., Ltd., Queenstown, Tasmania for 1955

Mill feed	5.03	8.05
Mill tailing	4.26	7.68
Percent recovery from mill tailing		41.1
Pyrite production (tons)		49,432



FLOTATION CONCENTRATOR in the background and smelter in the foreground. This picture was taken on a sunny day which is unusual because it rains more than 125 inches per year.



HESSIAN STRAKES recovery gold from flotation tailing. Total strake length pictured here is 624-feet. Note how there are two lines of flow away from, and two lines toward the camera.

tors at the top of the Quarigil are connected by Cordtex to a millisecond delay blasting switch with a delay of about one-fourtieth second between holes. Holes are stemmed with granulated slag from the smelter. For toe holes, wagon drills of 1½-inch-diameter are used, explosive being AN60 Celignite.

There are two main blasts weekly, involving 20 holes. This takes care of a normal week's supply of 30,000 tons of ore but up to 60,000 tons have been broken at one time. Secondary drilling is by jackhammers using ¾-inch hexagonal steel.

For every foot of churn drill hole 28.5 tons of ore are broken. In rock stripping 22.2 tons of ore are broken per foot of hole. In secondary blasting 1.0 foot of hole is drilled for 26.8 tons

of ore. Total powder consumption is 1.0 pound for 3.4 tons of ore.

The 5-cubic-yard shovels, three operating at one time, have an average loading rate of 750 tons per hour (maximum rate 1,070 tons per hour). Ore is hauled by the Euclids an average distance of 4,000 feet to a crusher station. Road surfaces are maintained in good condition although mostly unpaved. Despite adverse climatic conditions the safety record is excellent and no fatal accident has occurred in the haulage section. Although grades are as much as 1 in 12, they are mostly downhill for loaded vehicles.

Main Crusher Station

Located near the open pit is an 84- by 60-inch Allis-Chalmers jaw

crusher with a capacity of 700 tons per hour set at a 9-inch discharge opening. The crusher is driven at 90 revolutions per minute through v-belts by a 250 h.p., 3,000-volt induction motor. Due to the increasing depth of the open cut, it is intended to install a new 84-inch by 60-inch crusher at a lower point where it will reduce the distance travelled by the Euclids. The new equipment is on order from Morgardshammers Aktiebolag, Sweden. Purchase of a second crusher is a characteristically bold step designed to avoid any halt to production.

Crushed ore is delivered to a transfer pass by a 9-ply conveyor belt 60 inches wide moving at 350 feet per minute. It gravitates to a tunnel

Continued on page 57 (WM63)

MONEY MAKING METHODS



PICTURE NO. I. "Tire Breaker" showing four arms, ring plate, and 100-ton hydraulic jack. Arms move out as plate rises.

"Tire Breaker" Is the Easiest Way To Mount Heavy Truck Tires on Rims

At the Anaconda Company's open-pit mine at Weed Heights, Nevada, Bill Cross, in charge of all automotive and mobile equipment repair and maintenance, has developed a unique device which he calls the "Tire Breaker." This device is used for demounting and mounting the large 18:00- by 25:00-inch, 28-ply tires used on the large Dart haulage trucks.



BILL CROSS

Picture No. I shows the Tire Breaker which consists of four arms anchored to the base of the breaker. These arms are held by pins in order that they may be brought together at a central point to permit the placing of the tire or the removing of the tire. The Tire Breaker is operated by a



PICTURE No. III. Pressure has forced the tapered seat band away from the side flange by the upward travel of plate.



PICTURE NO. II. Tire in place on Breaker showing how the arms are placed on the upper side flange of tire rim. Note hoist.

100-ton hydraulic jack placed on the square base plate which, in turn, pushes against the circular plate. This plate then contacts the rim base of the tire. The hydraulic action against the plate is actuated by the small high pressure hydraulic pump shown at the lower right-hand corner of Picture No. II. This hydraulic pump has a capacity of 10,000 pounds per square inch.

Picture No. II shows the tire in place on the Tire Breaker with the arms contacting the upper side flange of the rim. As the tire and rim are forced upward by the hydraulic pressure pushing against the plate, the Tire Breaker arms force the flange down and off the tapered bead seat band.

Picture No. III shows the separation of the side flange and the tapered bead seat band after the above described action has been completed.

Picture No. IV completes the cycle and shows two small jacks mounted on the upper part of the press and connected to the "Ring Pusher." By the hydraulic action of these two small jacks, the bead seat band is pressed down and off the lock ring so that it can be removed.

In mounting the tire on the rim, the reverse procedure can be followed.

Use of the "Breaker" permits an 18:00- by 25:00-inch tire to be easily mounted, or demounted, by one man in 15 minutes and is especially useful in mounting stiff new tires.



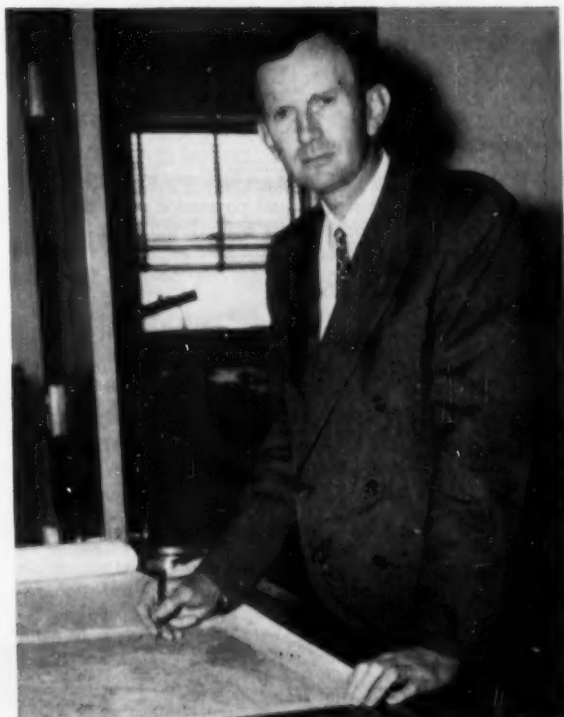
PICTURE NO. IV. Two small hydraulic jacks are next used to push off the lock ring from the bead seat band for removal.

What's The Status of Unpatented Claims?

The Forest Service Answers Some Questions About How It Administers Public Law 167



W. C. SANBORN
Mining Engineer
U. S. Forest Service



W. S. DAVIS, Assistant Chief
Division of Recreational Lands,
California Region, U. S. Forest Service

Most prospectors and miners know that Congress passed a law last summer amending the United States general mining laws (Public Law 167, Act of July 23, 1955 (69 Stat. 367)).

Of vital importance to owners of mineral claims filed prior to enactment of Public Law 167 is that part of the law (Sec. 5) establishing an "in rem" procedure for clearing up title uncertainties and for determination of surface rights on previously located claims. The section likewise provides claim owners means whereby they might retain exclusive control of valid claims if they wish, as well as a practical way to resolve the status of virtually thousands of unidentifiable or abandoned locations or claims of uncertain category.

In this exclusive interview MINING WORLD learns from W. C. Sanborn, mining engineer, U. S. Forest Service; and W. S. Davis, assistant chief, Division of Recreational Lands, California Region, U. S. Forest Service the steps the owner of a claim filed prior to July 23, 1955, can take in the event a SURFACE RIGHTS DETERMINATION is undertaken for the area within which his claim is located as well as an attempt to provide answers to some of the questions the law brings up.

The law continues to give prospectors and miners the right to seek out mineral deposits, establish claim thereon, and to secure patent to unappropriated land the same as before.

While fully protecting the right of a locator to use his claim and timber thereon for prospecting, mining, or processing operations and uses reasonably incident thereto, the law restricts his use to just that.

It also establishes that new claims shall be subject to the right of the United States to manage and dispose of the vegetative resources and to manage other surface resources providing use of the surface does not endanger or materially interfere with prospecting, and mining operations. The miner's interest is further safeguarded by the provision that where the Government disposes of timber from a claim and more timber is needed for mining than that remaining he shall be entitled to be supplied (free of charge) with substantially like kind and quantity from the nearest available timber ready for harvesting.

Q. Does the new law have any effect on a claim located before July 23, 1955?

A. There is no change in the status of such claim until the

Interview

government starts publication of a determination of surface rights for the area the claim is situated in.

Q. Who starts the procedure for determination of surface rights?

A. The Bureau of Land Management on Public Domain Land and the Forest Service in the National Forests.

Q. What is the first step in the surface rights determination procedure?

A. The government must make a preliminary examination of the subdivisions of land that will be set forth in the notice of publication.

Q. What is the purpose of the preliminary examination?

A. To ascertain who is in actual possession of the land or engaged in the working of the land and their address, if possible, in order that a copy of the notice of surface right determination procedure can be sent them by registered mail.

Q. Where and how long will notices be published?

A. In a newspaper of general circulation for the area presumably selected by the manager of the District Land Office as is the case in patent proceedings. The publication will run for nine consecutive weeks.

Q. How can a person be absolutely certain to receive a notice if a surface rights determination is undertaken for the area his claim is situated?

A. By causing a duly acknowledged request for any such notice be recorded in county recorders office where his claim location is recorded. The law requires such requests shall set forth the name and address of the person requesting copies and shall also set forth as to each claim such person asserts rights:

- (1) the date of location
- (2) the book and page of the recordation of the notice or certificate of location; and
- (3) the section or sections of the public land surveys which embrace such mining claims, or if such lands are unsurveyed, either the section or sections which would probably embrace such mining claim when the public land surveys are extended to such lands or a tie by courses and distances to an approved United States mineral monument.

Q. What can a claimant do after receiving a notice that a determination of surface rights is being undertaken for the area his claim is in and what are the effects?

A. He has three options:

1. He can ignore the notice. In such event, the claim simply reverts to the category of one filed under the new law.
2. He can execute a waiver relinquishing all surface rights contrary to those a person would get on claims filed under Public Law 167.

Status of Published Surface Rights Areas Determinations

Forest	State	Name of Area	Acres in Area	Date of First Newspaper Publication
Bitterroot	Montana	Blue Joint	7,040	3/15/56
Clearwater	Idaho	Cedars	48,000	3/22/56
Arapaho	Colorado	North Clear Creek	30,320	5/25/56
Santa Fe	New Mexico	Coyote-Gallina	109,756	(1)
Manti-LaSal	Utah	North Elk Ridge	128,320	5/10/56
Salmon	Idaho	Hughes Creek	178,000	4/26/56
Sequoia	California	Greenhorn	48,960	(1)
Snoqualmie	Washington	North Fork Snoqualmie	22,700	4/25/56

(1) In process of being published.

3. He can file a verified statement which sets forth:

- (a) the date of location;
- (b) the book and page of recordation of the notice or certificate of location;
- (c) the section or sections of the public land surveys which embrace such mining claims; or if such lands are unsurveyed either the section or sections which would probably embrace such mining claim when the public land surveys are extended to such lands or a tie by courses and distances to an approved U. S. mineral monument;
- (d) whether such claimant is a locator or purchaser under such location; and
- (e) the name and address of such claimant and names and addresses so far as known to the claimant of any other person or persons claiming any interest or interests in or under such unpatented mining claim.

Q. How long does a person who receives a notice of publication of a determination of surface rights have to exercise either option 2 or 3?

A. 150 days after date of first publication.

Q. How soon after the first publication can a claimant expect to receive a notice?

A. The law requires that the government agency initiating the procedure mail out notices within 15 days after the date of first publication.

Q. Can a person who didn't for some reason receive a notice file a verified statement?

A. Yes. He has the same right to do so as those receiving notice.

Q. Where must verified statements be filed?

A. With the manager of the U. S. Land Office for the district in which the claim is located.

Q. What happens after a verified statement is filed?

A. The land involved by the location will be examined by a government mining engineer or geologist.

Q. Will this examination be pretty complete, say to the extent of sampling to check the extent and value of the discovery?

A. Yes, it will be made along the lines of the usual examination in connection with patent and contest investigations.

Q. Then what happens?

A. There are two possibilities. If examination indicates that the claimant's asserted rights are valid and effective, a stipulation to that effect can be made and the claimant retains exclusive control of his claim without further ado such as need of appearing at a hearing.

On the other hand, if examination discloses there is doubt as to the validity and effectiveness of the asserted rights a hearing will be held wherein both sides may introduce evidence and present testimony.

Q. Where will the hearings be held?

A. In the county where the claim in question is situated.

Q. Who fixes the time and place for the hearings?

A. The law provides that the Secretary of Interior make this determination, but presumably the authority will be delegated to the Bureau of Land Management as is the case in patent and contest proceedings.

Q. Who will conduct the hearings?

A. The Bureau of Land Management.

Q. As a result of these hearings, will a ruling be made as to the validity of the claims involved?

A. It is understood the decision will cover only the validity and effectiveness of the asserted rights.

Q. Can a person appeal these decisions?

A. I presume the decisions will be subject to appeal to the Director of the Bureau of Land Management and the Secretary of the Interior as is the case in mineral contest and patent proceedings.

Q. What happens if the decision is adverse to the claimant?

A. Simply that the claim reverts to the category of one located after enactment of Public Law 167.

Q. Then a claimant's right to mine and occupy so much of the surface as is needed for such purposes is not affected?

A. That is right.

Q. If the decision is adverse to the Government, what happens?

A. The claimant retains the right of exclusive use and enjoyment of his location.

Q. Did the new law change the requirements for obtaining mineral patent or in any way reduce this fee simple title?

A. No, it did not.

Q. Can a person who files a claim under the new law on the basis of the discovery of say gold or some other mineral recognized as coming within the purview of the mining law, sell or dispose of so called common sand, stone, etc., occurring within his claim?

A. Not unless removal is necessary to permit bona fide mining or the material falls in the category of being a byproduct of a mining operation such as gravel from which gold is being extracted.

Q. Will the law facilitate public land management?

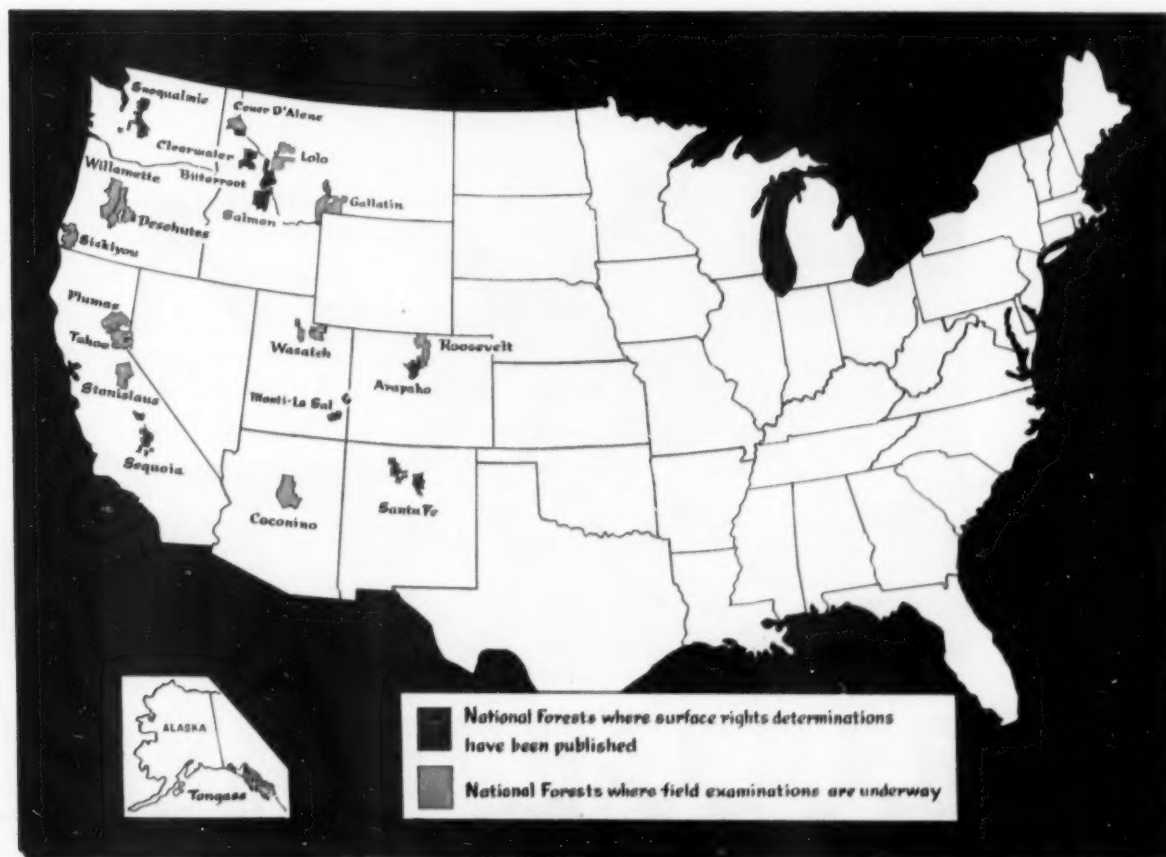
A. It very definitely will. For example, on new claims—the time consuming and sometimes expensive problem of access is taken care of—mature timber can be harvested without the necessity of seeking out claim owners in an endeavor to secure cutting right waivers—makes possible a fuller measure of use and enjoyment of the public to mention a few.

Q. Is the Forest Service proceeding with any preliminary surface rights determination examinations in California?

A. Yes. Work is presently being carried on in selected areas on the Sequoia, Stanislaus, Tahoe, and Plumas National Forests.

Q. Have publication of notice of any of the area been started?

A. No, not in California as yet.



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Personalities in the News

WILLIAM H. GOODRICH, general manager of the China Mines Division of Kennecott Copper Corporation, was awarded an honorary degree of Doctor of Laws by New Mexico A & M College at its 63rd annual commencement. Mr. Goodrich began



his mining activities in South America, and after 13 years there returned to the United States in 1937 as assistant mine superintendent of the Kennecott open pit copper mine at Santa Rita, New Mexico. In 1941 he was named general superintendent of mines and took over his present post in 1947.

William N. Matheson, Jr. has been named vice president of operations for Oliver Iron Mining Division of the United States Steel Corporation, Duluth, Minnesota. Since 1933 Mr. Matheson has been actively engaged as an operator and supervisor in charge of Oliver operations, and was appointed vice president in charge of sales and planning in June 1953.

Bruce B. Whitney has been appointed general superintendent of operations at the Christmas mine near Winkelman, under development by Inspiration Consolidated Copper Company, Inspiration, Arizona. Mr. Whitney has been assistant mine superintendent for Inspiration and will be succeeded in that position by **Thomas E. Bilson**, former general foreman of the open-pit operations. **Thomas M. Anderson** takes over Mr. Bilson's duties at the pit.

Harry J. Wolf, mining and consulting engineer of New York, has examined nonmetallic mineral deposits in the Carolinas, and several uranium properties in Utah and adjacent states during the past few months, and has recently completed an investigation of tungsten resources of Boulder County, Colorado.

William G. Maloney was chosen secretary-treasurer of the Mining Association of Montana, replacing the late **Carl J. Trauerman**, who was secretary-manager. Mr. Maloney is well known in Butte for his mining work and has served in various government capacities since 1927. At present he is on the staff of Senator **James E. Murray**.

Archie J. McDonell is the new manager of the Foote Mineral Company chemical plant at Sunbright, Virginia. Mr. McDonell comes to Foote from the Tahawus, New York plant of the National Lead Company, where he was chief engineer and assistant plant manager.

Edward T. Knight, exploration manager, has been named vice president of the Rosario Exploration Company, a subsidiary of the New York and Honduras Rosario Mining Company in Grand Junction, Colorado.

Howard Evans, former mineral processing engineer at the Oliver Iron

Mining Division's research laboratory, has been transferred to U. S. Steel's Columbia Iron Mining Company at Cedar City, Utah, as supervisor of the beneficiation laboratory.

Robert F. Winkle has joined the industrial engineering department of Ray Mines Division, Kennecott Copper Corporation at Hayden, Arizona. Mr. Winkle returns to Ray after an absence of nine years. During that period he worked as a mining engineer in Chile, the Dominican Republic, and at the New York office of the U.S. Atomic Energy Commission.

Alan M. Simpson has taken over the post as president and general manager of Beaver Mesa Uranium, Inc., Grand Junction, Colorado, from **Robert E. Simpson**, who resigned. **Charles V. Woodward** was retained as vice president, **D. Howe Moffat** as secretary, and **Mark Holloway** was appointed treasurer. **D. G. Son** is a new board member.

Forbes K. Wilson was elected assistant vice president of the Freeport Sulphur Company recently. He is also vice president of Nicaro Nickel Company, a wholly owned subsidiary, and is presently assisting in the program to produce nickel and cobalt from deposits owned by the Nicaro company at Moa Bay, Cuba.

Alba W. Jeffers has joined the staff of Shattuck Denn Mining Corporation as senior research metallurgical engineer in its new development and research laboratory at Humboldt, Arizona. For several years Mr. Jeffers was technical representative for American Cyanamid Company's Mineral Dressing Division. **John Q. Jones** will assist Mr. Jeffers as research metallurgical engineer. He has been associated with the U.S. Atomic Energy Commission's raw materials development laboratory at Winchester, Massachusetts and Grand Junction, Colorado since 1951.

Medals for heroism were awarded by the Joseph A. Holmes Safety Association in Washington, D. C. to 11 workers in the nation's mineral industries recently. One award went to

JACK C. TURNER, president of Atomic Fuel Extraction Corporation, has announced that the company will build a uranium processing mill at Bedrock, Colorado. Mr. Turner and his associates have worked on the mill project nearly two years. When completed, the Bedrock plant will mill ore from



four major producing areas: Beaver Mesa, Martin Mesa, Tenderfoot Mesa, and Bull Canyon. **H. L. HAZEN**, uranium metallurgist, will oversee the new mill's operation. Mr. Hazen is a former advisor to **JESSE JOHNSON**, AEC raw materials director.

Ramon Villa Chavez, driller's helper at the Terlingua Mercury Corporation's Fresno Mine, Presidio County, Texas, who risked his life to save a driller badly injured by a premature blast. **Walter Bazan**, a miner at the M. A. Hanna Company's Cannon Mine, Iron River, Michigan, braved death by suffocation to save the life of a coworker. **Earl Bartschi** endangered his own life to save a fellow miner trapped by fallen rock which killed another worker in a mine of the Anaconda Company at Conda, Idaho. **James P. Rust**, miner for the A. C. Mining Company, Yuma, Arizona, tried to save the life of a partner even though he was seriously injured himself.

Robert H. Lyddan has become assistant director of the Geological Survey for the Department of the Interior. He has been regional engineer at the Atlantic office, topographic division, at Arlington, Virginia, since July 1955.

Arthur E. Adami, dean of Montana School of Mines, has retired after 53 years on the Mines campus. **Professor D. C. McAuliffe**, a faculty member at the school since 1923, is the new dean. At this year's commencement exercises, Dean Adami was

Outstanding alumni of Colorado School of Mines were honored with distinguished achievement medals in conjunction with the school's 82nd commencement exercises. These medals, awarded for outstanding service by school of mines alumni, are roughly equivalent to an honorary degree. Nominees are selected by the



college board of trustees on suggestions from the alumni body, and less than two percent of alumni have been selected. 1956 recipients include **ARTHUR C. DAMANN** (above left), a graduate of the class of 1915, who organized the Denver Equipment Company in 1927 and has been president and general manager since. **FRANKLIN COOLBAUGH** (center) of the class of 1933 is vice president of Climax Molybdenum Company at Golden, Colorado. He also holds directorship and offices in a number of other mining companies. **PHILIP J. MCGUIRE** (right) is director of filtration product development for the Dorr-Oliver Company and graduated in the class of 1915. He started with the company in 1919 and his headquarters are at Oliver United Filters, Inc., Oakland, California. **CHARLES F. JORDAN, Jr.** (not pictured), from the class of 1923, is general manager of the American Smelting and Refining Company and also president and general manager of a number of South American mining companies.

awarded the honorary degree of Doctor of Engineering. The commencement speaker, **Horace M. Albright**, president of United States Potash Company, received an honorary Doctor of Laws degree. The professional degree of Engineer of Mines was awarded to **Emmet R. Cullity**, consulting engineer, **Frederick A. McGonigle**, vice president in charge of operations of Haile Mines, Inc., **Walter R. Landwehr**, chief geologist of the Western Mining Department of American Smelting and Refining Company, received the professional degree of Geological Engineer.

Hugh B. Lee, president of the Maumee Collieries Company, Terre Haute, Indiana, was recently bestowed with the title of "Distinguished Alumnus" by the College of Engineering, Ohio State University.

J. E. Machamer has resigned from his post as vice president of opera-

tions, Oliver Iron Mining Division, U. S. Steel Corporation. He has held this position since December 1946.

Dr. Grover C. Dillman, president of the Michigan College of Mining and Technology, has announced that he will retire in October.

F. S. Mulock, president of the American Zinc Institute, has been re-elected for a second term. He is president of the U. S. Smelting Refining & Mining Company of Boston.

Elton Clark has been transferred by Phelps Dodge Corporation from Douglas, Arizona to be in charge of drilling operations on the property the company has optioned from Mile High Minerals Inc. in the Crooks Gap area, Wyoming.

Joe G. Ivy will take over the job as assistant superintendent of maintenance & engineering, Potash Division

OWEN RICHARDS has taken over management of Metal & Thermo Corporation's new mine and titanium ore dressing plant at Beaver Dam, Hanover County, Virginia. Before joining Metal & Thermo, Mr. Richards was a plant design engineer for Carpc Research & Engineering Company. He has had several years of agricultural and industrial development work in China and Southeast Asia, and about three years of tin mining in Malaya. The new \$750,000 plant, which will produce both rutile and ilmenite, will be completed in the fall and assures an additional domestic source of titanium ore.



of International Minerals & Chemical Corporation at Carlsbad, New Mexico. He is transferring from the Chicago office to replace **A. B. Chafetz** who plans to open a consulting office in Carlsbad.

Dr. J. R. Van Pelt, president of the Montana School of Mines, is the newly elected president of Montana section, AIME. Other new officers are: **Thomas K. Graham**, vice president; **Clifford Hicks**, re-named secretary-treasurer; **Stanley Lane**, **Edward P. Shea**, **Godfrey Howard**, executive committee members.

John G. Barry is new deputy director of the exploration division, Grand Junction Operations Office, U. S. Atomic Energy Commission at Grand Junction, Colorado. **Philip H. Dodd** is now staff engineer and **Merle E. Crew** is chief of the engineering services branch.

Robert L. Hartzell, former Washington, D.C., representative for World Mining Consultants, Inc., has taken a position with Daimler-Benz of North America, Inc., also in Washington. He has been replaced at World Mining by **Cloyd M. Smith**, consulting engineer. World Mining Consultants, Inc. conducts a general consulting practice in its field with emphasis on geophysical and other exploration for ground water and mineral resources in foreign areas on behalf of International Cooperation Administration.

First meeting has been held of the recently appointed 15-member iron ore industry advisory committee to advise the Office of Minerals Mobilization with respect to problems concerning iron ore production and supply in various stages of mobilization planning. The committee includes: **C. W. Allen**, Cleveland-Cliffs Iron Company; **R. S. Archibald**, North Range Mining Company; **Philip D. Block, Jr.**, Inland Steel Company; **Paul B. Entekin**, Bethlehem Steel Company; **E. B. Germany**, Lone Star Steel Company; **Phillips Hawkins**, United States Steel Corporation; **Robert G. Heers**, Kaiser Steel Corporation; **C. C. Henning**, Jones & Laughlin Steel Corporation; **Herbert C. Jackson**, Pickands Mather & Co.; **Warren S. Moore**, W. S. Moore Company; **Howard W. Read**, Alan Wood Steel Company; **A. M. Shook III**, Shook & Fletcher Supply Company; **J. H. Thompson**, M. A. Hanna Company; **R. R. Williams**, Colorado Fuel & Iron Corporation; **E. B. Winning**, Republic Steel Corporation.

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News-makers in International Mining

R. D. PERRY has moved up to the post of vice president and general manager of Consolidated Mining and Smelting Company of Canada, Ltd. at Trail, B. C. He replaces **R. W. DIAMOND**, retired, as the firm's senior officer in the west. Mr. Perry joined Cominco in 1928 as an assayer and worked up to superintendent of the refining department in 1944. In 1945 he became labor relations officer and a year later was promoted to general superintendent of the research and development division. In 1949 he joined the management group as administrative assistant, and in 1951 was appointed assistant general manager, then general manager in 1952.



Dr. J. A. Bancroft, for many years associated with the Anglo American group and with the copper deposits of Northern Rhodesia where the Bancroft mine bears his name, has been awarded the gold medal of the Institute of Mining and Metallurgy.

Bruce A. Gould, consulting mining engineer in San Francisco, recently returned from a four-month business trip to England and Portugal and mining investigations in Southern Rhodesia.

Hans Neeb has accepted the position as assistant mining superintendent with the Acerias Paz del Rio, S.A., Bogota, Colombia.

M. A. Mawby has been appointed to the board of directors of three Australian firms with London headquarters: Consolidated Zinc Corporation Ltd., Zinc Corporation Ltd., and New Broken Hill Consolidated Ltd. **R. P. Hooper** has been named to the London boards of Zinc Corporation and New Broken Hill.

V. G. Ford of the Sinai Mining Company Ltd., Cairo, Egypt, will spend four months in the United Kingdom, returning to Egypt at the end of October.

Seiichi Komura is the new president of Mitsubishi Metal Mining Company, Ltd. of Tokyo, Japan. He succeeds the retiring president, **Michiyuki Hani**, who will serve in an advisory capacity.

J. N. V. Duncan, managing director, and **H. N. Saunders**, deputy managing director of Rio Tinto Company, Ltd. of London, have been visiting Johannesburg, Union of South Africa on a business trip.

A. W. Whitaker, Jr. and **McNeely DuBose** are new executive vice presidents of Aluminum Company of Canada Ltd. Mr. Whitaker has for many years been vice president and general manager of Alcan, the principal subsidiary of Aluminum Ltd. Mr. DuBose, who has been vice president of Alcan for several years, is in charge of the company's various hydroelectric power interests and directs the construction at Kitimat development.

Dr. S. A. Manus and **Dr. Ong Eng Goan** have joined the staff of the Uni-

versity of Indonesia at Bandung as assistants in the geology department. Both are graduates of the University of Leiden, The Netherlands.

A. J. Keast received the honorary degree of Doctor of Engineering at Michigan College of Mining and Technology recently. He graduated from Michigan Tech in 1923 and was that college's first Australian graduate. Mr. Keast was general manager of the first aluminum plant in the Southern Hemisphere at Bell Bay, Tasmania. Under his direction it was built and brought into production in 1955 for the Commonwealth Government of Australia. Since 1955 he has been managing director and technical director for the Rio Tinto Mining Company in Australia.

A. C. Jorgensen, formerly of Port Pirie, is now chief engineer with Emperor Gold Mining Company Ltd., Vatuksola, Fiji Islands.

Dr. W. B. Agocs, United States authority on air-borne geological and geophysical survey, visited South Africa recently.

M. W. Howell, previously with New Broken Hill Consolidated Ltd., Australia, has accepted the position of manager for Broken Hill South Limited.

Dr. J. Kanis, geologist, is with the New African Mica Company, Ltd., an American firm in Tanganyika.

E. Malmberg, far eastern representative of Marion Power Shovel Company, Ohio, is conducting a market survey in Australia and New Zealand.

Gerald E. Coke has been appointed chairman of the Rio Tinto Company, Rio Tinto Management Services, and Rio Tinto Finance and Exploration, United Kingdom. He succeeds the late Lord Bessborough.

J. C. Webb of Australia's Atomic Energy Commission has been on a consultative visit to South Africa.

A. M. Bensusan, mining engineer in Southern Rhodesia, is spending two months in England with the Hunting Geophysics Company.

GORDON I. GOULD, internationally known mercury expert and president of Gordon I. Gould and Company of San Francisco, California, is currently on an around-the-world trip. His first stop is in Italy where he will make the final operational adjustments on the two new Gould kilns at the plant of the Monte Amiata Societa Mineraria per Azioni. From Italy he will fly to the Philippines for an inspection of Palawan Quicksilver Mines, Inc. He also will visit mercury mines and plants in Japan.



A. J. Cayia has advanced from his position as vice president and general manager of Caland Ore Company, Ltd. to become president and general manager. Caland is a Canadian iron ore mining subsidiary of Inland Steel Company. Mr. Cayia is also president of Inland Lime and Stone Company, the company's limestone division near Manistique, Michigan. **P. E. Block, Jr.**, former president of Caland, is now chairman of the board.

Gerardo Grassmuck, mining engineer, has accepted the temporary assignment as mine superintendent with Incomi, S.A., Buenos Aires, Argentina.

Ravindranath Kanumural, general foreman of a Bombay steel works, is spending six months in England studying specialized techniques in the steel industry, particularly foundry work. Most of his time will be spent at the English Steel Corporation, Sheffield, and Grimsthorpe foundry, Lincolnshire. He is visiting under the Technical Co-operation Scheme of the Colombo Plan.

D. Buchanan of Mount Isa Mines, Australia, is visiting converter plants in the United States and Europe, and will return home by way of the Belgian Congo, Rhodesia, and the Union of South Africa.



CLYDE E. WEED (left) is the new president of Anaconda Company and three subsidiaries, Chile Copper Company, Chile Exploration Company, and Andes Copper Mining Company. Vice president in charge of operations since 1952, Mr. Weed is the first mining engineer to hold the post of president since 1915. All others since then were lawyers or financial executives. **THOMAS A. CAMPBELL** (second), executive vice president of Chile Exploration and Andes Copper since 1952, has been elected vice president of the parent company and president of Anaconda Sales Company. **W. KENNETH DALY** (third), comptroller since 1940, was elected vice president and controller of the company. **CHARLES BRINCKERHOFF** (right), general manager of South American operations of Chile Exploration and Andes Copper since 1948, has been chosen vice president of both companies. He continues as general manager of South American operations. **ROBERT E. DWYER**, retiring president of Anaconda, began with the company in 1903. **ELBERT O. SOWER-WINE**, a vice president since 1945, has retired after 49 years with the company.



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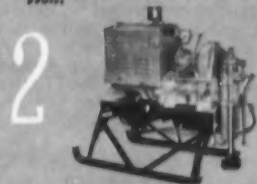
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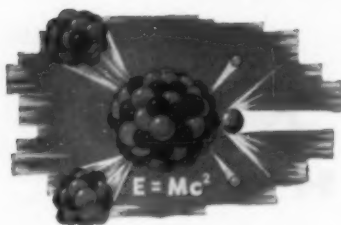


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FISSION FACTS

Monthly Roundup of Mining News
In the Atomic Energy Field

Federal Uranium Sells To Hidden Splendor

Federal Uranium Corporation has sold its one-third interest in a group of 17 uranium claims for a cash price of \$3,350,000. The claims are known as the Daniel-Ruddock group and are located in the north end of the Big Indian Mining District, southeast of Moab, Utah.

Federal's interest in the claims was sold to Hidden Splendor Mining Company. The sale represented the exercising of an option on the property granted last November to Moore and Schley, New York investment bankers. The option later was assigned to Hidden Splendor by Moore and Schley. Hidden Splendor previously had acquired the other two-thirds interest in the property.

The cash received in the transaction amounts to approximately 60 cents for each of the outstanding shares in Federal. In addition to this substantial cash position, the company is producing ore from six mines in three states and is 50 percent owner of Radorock Resources, Inc., which has one of the richest ore bodies in the nation. Federal is now beginning an extensive exploration program on its other holdings.

United Western Announces Ambrosia U₃O₈ Discovery

The core and rotary drilling program of United Western Minerals Company has blocked out important reserves of uranium ore in the Ambrosia Lake area of McKinley County, New Mexico, according to Alva A. Simpson, Jr., United Western president.

To date, 110,750 feet of drilling on 100-foot centers have been completed with further drilling scheduled in Sec. 32, T. 14 N., R. 9 W. The engineering and geological firm of Chapman and Wood, Albuquerque, New Mexico is in charge of the operation.

Ore from this section will be committed for processing to the Foley Metals Corporation which has joined with United Western, Rio de Oro Uranium Mines, Inc., San Jacinto Petroleum Corporation, White, Weld & Company, and J. H. Whitney & Company, in making application to the Atomic Energy Commission for a 700- to 1,000-ton uranium processing mill in the Grants area.

Solid One-Ton Pitchblende Nugget Mined In Australia

A solid pitchblende nugget weighing one ton and estimated to be worth \$15,750 has been hoisted through the El Sharana mine shaft at Alligator River, Northern Australia.

The mine is operated by United Uranium and only two shafts have so far been sunk on the company's claim area of 32 square miles. United Uranium is an operating company for Northern Uranium Development N.L. and Uranium Mines N.L. Some very rich pitchblende values are being disclosed on the 52 foot level—much higher than expected as a result of surface wagon drilling last year. In one case where a drill hole indicated up to 2.5 percent uranium oxide, a winze 7 feet deep yielded an average assay of 16.8 percent. The east drive on the 57-foot level has advanced from 30 to 104 feet in lode assaying 3.10 percent over 4 feet with ore in both walls. The west drive has advanced 27 to 53 feet in lode assaying 0.68 percent.

Colorado Firms to Build Two New Uranium Mills

The Atomic Fuel Extraction Corporation is planning to build a new uranium

mill at Bedrock, Montrose County, Colorado under terms of a recently signed contract with the United States Atomic Energy Commission.

Bedrock is on the Dolores River in Paradox Valley, about 15 miles west of Uravan where Union Carbide Nuclear Company operates the largest Colorado uranium mill.

The new mill will process ores from Beaver Mesa, Martin Mesa, Tenderfoot Mesa, and the Bull Canyon area. An acid leach resin-in-pulp circuit will be used to treat the ores.

The AEC has also contracted with Carbide Nuclear to build a new uranium mill adjacent to its existing mill at Rifle, Garfield County. The new mill will be larger than the present mill. Ore for the mill will be trucked and railed from mines in western Colorado and eastern Utah.

In addition to the new mill, Nuclear will build new up-grading plants in Utah and Colorado for near-mine treatment of low-grade ores.

A. E. C. Extends Uranium Procurement Program Through 1966

The extension of the United States Atomic Energy Commission's domestic uranium procurement program through December 31, 1966 is of greatest importance to the mining industry. The announcement made on May 24th contained the following pertinent points:

PROGRAM DATES—Present ore buying program continues through March 31, 1956. From then until December 31, 1966, uranium concentrates will be the only raw material purchased. The present initial production bonus for ore has been extended through March 31, 1960.

CONCENTRATE BASE PRICE has been set at \$8.00 per pound of U₃O₈ contained in concentrates meeting specifications. That is for high-grade chemical precipitates of type currently being purchased from mills. Concentrate purchases will be made only under contract.

MILL AMORTIZATION for construction contracted before March 31, 1962 may be amortized beyond that date for a period not to exceed five years.

LIMITATION ON PURCHASE of concentrate has been set with the Commission, at its option, buying a maximum of 500 tons of U₃O₈ per year from any one mining property or mining operation. If additional tonnage is purchased it may be at lower prices.

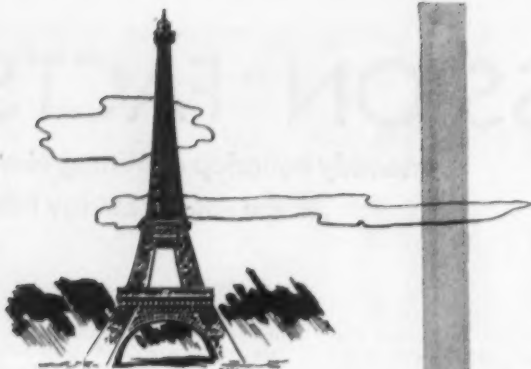
COMMERCIAL SALES are permitted and encouraged under the new program. Producers will be able to sell direct to commercial users in the United States licensed by the AEC.

VANADIUM PURCHASE commitments will not be made after March 31, 1956 by the AEC.

PRODUCTION BONUS will be extended as outlined above for the first 10,000 pounds of uranium oxide in ore delivered from an eligible mining property to an authorized buying station or mill. The bonus ranges from \$1.50 per pound of uranium oxide in ore assaying 0.10 percent uranium oxide to \$3.50 per pound of uranium oxide in ore assaying 0.20 percent uranium oxide and above.

Reports from Canada indicate that there is a good chance the Canadian government will not extend its buying program beyond March 31, 1962.

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director of Research at
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Barthelemy is well known as a trouble shooter in ore dressing . . . his experience in the field is as wide and varied as his colorful personal background. Born and educated in France, he is now an American citizen. Prior to joining the Carpco staff, Barthelemy graduated from the Paris School of Mines . . . spent several years as Director and General Manager of Compagnie Minière et Metallurgique de l'Indochine at Hanoi, and was consultant to the Bank of Indo-China. He has also served as director and consulting engineer at the Société d'Etudes et d'Exploitations Minières des l'Inini, French Guiana.

Barthelemy joined the Free French under DeGaulle in 1941 and worked in directing French underground in London in 1943. He served as Liaison Officer (Captain) with the U. S. Army in Paris in 1944-45. His decorations include the Bronze Star and Legion d'Honneur. One of his proudest achievements—the honor bestowed upon him by the King of Laos—Chevalier de l'ordre royal du Million d'Elephants et du Parasol Blanc.

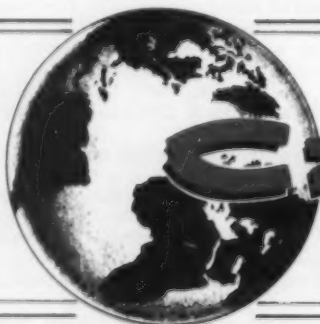
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ASARCO Builds Plant For Canadian Asbestos

A large asbestos ore milling plant with a 5,000-ton-per-day capacity is now under construction for Lake Asbestos of Quebec, Ltd. The \$7,700,000 contract was awarded F. H. McGraw Company, of Canada, Ltd. by this wholly owned Canadian subsidiary of American Smelting and Refining Company.

More than \$9,000,000 will be spent for the structure and milling machinery which will produce about 100,000 tons of asbestos fiber annually when the plant is finished early in 1958.

Asbestos ore will come from ore bodies 7 to 200 feet beneath the waters of Black Lake, located 75 miles south of Quebec City and 130 miles northeast of Montreal. The lake is now being dredged and will be mined by open pit. ASARCO plans to spend more than \$32,000,000 to develop this mine.

Form Uganda Company To Mine Columbite

Rich deposits of apatite and columbite concentrates in the Sukulu Hills of Africa near Tororo, Uganda, will be developed by the new company Sukulu Mines Ltd., a joint venture of the Uganda Development Corporation Ltd., the Canadian company, Frobisher Ltd., and Olin Mathieson Chemical Corporation, of the United States.

About £1,300,000 will be invested in mining and milling operations, with the mill to begin production in 1958. Mining of 420,000 tons annually will produce about 100,000 tons of apatite concentrates and 500,000 pounds of columbite per year. About 7% percent of the abundant deposits will be exhausted after 25 years.

This development is the result of several years of testing in the area by Tororo Exploration Company, formed by Frobisher, Uganda Development, Rio Tinto Company, and Monsanto Chemical Company. Extensive testing revealed more than 200,000,000 tons of soil containing workable amounts of apatite and pyrochlore.

Lead-Zinc Meeting Sets High Production Goals

Key leaders in the United States lead and zinc mining industries have set high goals for future production and have called for government cooperation in maintaining them. The occasion was the recent combined session in St. Louis of the American Zinc Institute's 38th Annual Meeting and the Lead Industries Association convention.

Jean Vuillequez, vice president of the American Metal Company, Ltd., was one of the chief speakers for the special joint session. In his talk on "World Lead and Zinc Supplies and Requirements" he predicted that in the next 10 years an increase of from 20 to 25 percent in the free world's use of lead is necessary, and that zinc must find additional markets so as to increase its use by at least 35 percent if consumption is to keep up with potential production.

M. P. Romney, manager of Utah Mining Association, discussed "Zinc and Lead Mining in the United States." He said that lead-zinc mining production in

the United States has suffered from continuing imports; the approaching end of government stockpiling; and the increasing deficit in mine operating income resulting from increased cost of production and the present and long term average low price of the metals produced by the lead-zinc operator. He went on to say that the zinc-lead mining industry needs help from all interested parties if it is to make any kind of recovery in the near future.

"Some Washington Observations" were presented by the Honorable F. E. Wormser, Assistant Secretary, U. S. Department of the Interior. He declared himself in favor of a reasonable tax on lead and zinc imports to help maintain domestic mining operations for both defense and commercial purposes when the current government plan of stockpiling is complete. Such a tax, he said, would serve to give the domestic producer a slightly higher price than that of the world market and at the same time would impose little penalty on the foreign producer selling in the United States markets.

He reported that the Administration is embarking on a program of acquiring critical and strategic materials over and above those needed for military stockpiling "and that these acquisitions are to be isolated from commercial markets in the same manner as the military stockpile."

Mr. Wormser also favors United States membership in the Organization of Trade Cooperation. "It is an opportunity to encourage other nations to dispense with government enterprises, rid themselves of cartels, and lift the heavy hand of bureaucratic controls," he said. "It is an opportunity to sell capitalism."

Dr. A. J. Phillips, vice president and director of research at American Smelting & Refining Company, reported on "Effects of Technical Developments in Creating New Markets for Lead and Zinc" and said there was a need for more fundamental data on both metals and their alloys.

Minerals Engineering Signs Tungsten Contract

Minerals Engineering Company of Grand Junction, Colorado and Salt Lake City, Utah has signed a five-year contract to supply up to 5,000 units of tungsten monthly to Darby & Company of London, England. The production will come from the firm's new tungsten property in Mexico. Minerals Engineering acquired a controlling interest in Minas y Metales, S.A. of Mexico and plans to install a mill at the mine by the end of the year. (See MINING WORLD, June 1956, page 77.)

Philippines Set for Record Mineral Output in 1956

Philippine mineral production will pass the Pesos 200,000,000 mark in 1956, according to Mines Director Benjamin Gozon. This would be an increase of at least 30 percent over production in 1955, valued at Pesos 167,780,000.

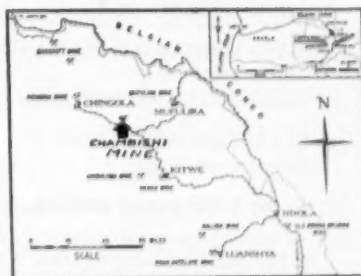
In a report to the House Committee on Economic Planning, Mr. Gozon summarized some of the important projects to be undertaken by Philippine mining concerns this year, which will add to this year's final production figures: Philippine Iron Mines will increase its output of iron ore by about 500,000 tons annually through beneficiation; Mati Iron Mine has gone into production on its 1,333,333-ton deposit; Atlas Consolidated Mining and Development Corporation is increasing daily output from 6,000 to 10,000 tons of copper ore; Masara Mining Company will have its first full year of production this year, after limited operations in 1955 produced 10,534 tons of gold and copper ore; and Palawan Mercury Quicksilver Mines Inc., which started operations last August, reached capacity in December and can now produce 200 flasks of 76 pounds of quicksilver monthly.

Rhodesian Selection Trust To Undertake Development of Chambishi Copper Ore Body

Chambishi Mines, Ltd., a member of the Rhodesian Selection Trust group, will undertake development of the Chambishi ore body, located about 16 miles north of Kitwe on the road to Chingola and 20 miles to the west of Mufulira. (See place-fix map.)

Detailed prospecting of the Chambishi orebody by Rhodesian Selection Trust started early in 1927. By 1931 the orebody had been drilled and ore reserves amounting to 25,000,000 tons at an average grade of 3.46 percent copper had been outlined. At that time it was proposed to mine a certain amount of high grade ore lying near the footwall of the deposit to supplement the production from the Mufulira mine which was also then under development. The ore was to be transported over a rail link which was to be built to Mufulira where it would be treated in the Mufulira concentrator then under construction.

Shaft sinking at Chambishi began in October 1930. Three shafts were started, one inclined and two vertical. The inclined shaft and one vertical were abandoned at shallow depths; the other verti-



cal shaft, No. 1 shaft, was sunk 585 feet.

In June 1931, however, development results at Mufulira had so exceeded original anticipations that it was apparent that the Mufulira mine alone could produce sufficient high-grade ore to operate its plant to capacity. The effects of the world depression were also being felt and for these reasons all development work at Chambishi was stopped. The Mufulira-Chambishi railway was, however, completed in April 1932, and subsequently linked with Kitwe.

Diamond Drilling Experts Hold Meeting In Canada

Diamond drilling authorities from all over the world met in Toronto, Canada early in June for the International Diamond Drilling Conference. Sponsored by the Canadian Diamond Drilling Association, it was also the occasion of their 13th Annual Convention and the spring meeting of the Diamond Core Drill Manufacturers Association (United States).

"Soil Sampling with the Diamond Drill" by Frank C. Sturges, vice president and general manager of the Pennsylvania Drilling Company, Pittsburgh, was one of the outstanding papers pre-

sented at the conference. Others included "Core Recovery in Soft Formations" by Adrian Ross, president of Sprague & Henwood, Inc., Scranton, Pennsylvania; "Core Drilling with Wire Line Barrel", accompanied by a film, by V. N. Burnhart, operations manager of E. J. Longyear Company, Minneapolis; "Diamond Drilling with Air Circulation" by Robert R. Carver, vice president, Western Branch of Sprague & Henwood, Inc.

Parallel papers were presented on "Screw Feed versus Hydraulic Feed as Used in Canadian Drilling" by Perry Hall, president of Boyles Brothers Drilling Company, Vancouver, British Columbia, and "Screw Feed versus Hydraulic Feed as Used in the United States Drilling" by M. L. Tucker, chief engineer of

Chicago Pneumatic Tool Company, New York City.

The Australian expert, J. P. Jeffers, director and general manager, Mineral Drillers, Ltd., Preston, Victoria, spoke on diamond drilling in Australia and New Zealand. "Deep Hole Drilling in South Africa" was covered by G. J. van Eeden Joy-Sullivan (Africa) (Pty) Ltd., Johannesburg.

Mrs. Viola MacMillan, president of the Prospectors and Developers Association of Canada, spoke to wives of the convention delegates at a special ladies luncheon.

Texas Company Discovers Mexican Sulphur Deposit

Discovery of a 5,000,000-ton sulphur deposit was made recently at Texas International Sulphur Company holdings on Mexico's Tehuantepec Isthmus. The deposit is on 300 of the 123,000 acres in the company's concession from the Mexican government, near the port of Vera Cruz.

The company began exploratory drilling last fall, using a master plan for the geological and geophysical exploration of the entire concession. Operations are under the direction of Dr. J. Brian Eby, Houston geologist.

Huge Merger in Canada Forms New Uranium Firm

A huge new uranium mining holding company, The Rio Tinto Mining Company of Canada Limited, has been formed through the amalgamation of the Canadian mining empire of Joseph H. Hirshhorn and the Canadian properties of the British-owned Rio Tinto Company, Limited of London (Rio Tinto London).

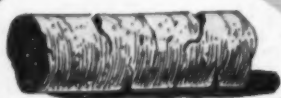
The new company consists of mining interests having a value of about \$50,-000,000 which includes important holdings in Blind River, Ontario uranium mining companies with special price contracts, and other companies in the same field with known ore reserves, and also includes a group of base metal investments. The major companies owned by Rio Tinto Mining Company of Canada Limited are Pronto Uranium Mines Limited, Algom Uranium Mines Limited, Lake Nordic Uranium Mines Limited, Panel Consolidated Uranium Mines Limited, and Spanish American Mines Limited.

Control of the new company resides in Rio Tinto London, formed in 1873 to acquire and operate the Rio Tinto mines in Spain. These mines at one time were one of the world's largest copper producers and later developed into one of the greatest European sources of pyrite.

Rio Tinto London has long been interested in mining activities outside Spain and in the 1920's played an important role in the development of the Northern Rhodesian copper belt and acquired large interests in Rhodesian copper companies. In recent years Rio Tinto London has sponsored substantial exploration activities in Africa, Australia, and Canada.

As a result of the amalgamation, all interests in Canadian properties formerly held by Rio Tinto London and its subsidiaries have been vested in Rio Tinto Canada.

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REPUBLIC OF THE PHILIPPINES—Samar Mining Company and Marinduque Iron Mines will jointly build a new steel mill and copper smelter. Manuel Elizalde, president of *Elizalde & Company* which manages the firms, reports that he has reached a tentative agreement with Japanese industrialists for shipment of iron and copper to Japan.

INDONESIA—Production from the N. V. *Abimanju Trading Company's* sulphur mine in the Dieng Mountains, is currently at the rate of about two tons per day.

NEW SOUTH WALES—*Crescent Rutile N.L.* has been formed in Adelaide to acquire and operate large rutile areas in New South Wales and Queensland. The areas are held under option by *Isa Syndicate* and *Australian Mining Syndicate*, and are located at Kilgare, N.S.W., and Noosaville, north of Brisbane. The Kilgare option is considered to contain between 10,000 and 15,000 tons of rutile.

VICTORIA—While sinking its internal inclined shaft toward the 25 level, *Morning Star (G.M.A.) Mines N.L.* unexpectedly intersected a large reef just above the 24 level. Shaft sinking has been suspended, therefore, and development of this reef with two others already cut above the 24 level, will soon be started. The shaft and headframe are expected to be in working condition in August. Good values are hoped for from at least one of the reefs after driving in a southerly direction. This old mine rarely shows satisfactory values from drilling but treatment of dyke formations over 80 years has always yielded satisfactory gold production.

REPUBLIC OF THE PHILIPPINES—Both houses of the Philippine Congress approved the Emergency Gold Mining Assistance Act which extends the government subsidy to gold mines for two additional years beyond the original expiration date of June 30. The bill also extends subsidy privileges to four mining companies producing gold as a by-product—*Atlas Consolidated Mining and Development Corporation*, *Lepanto Consolidated Mining Company*, *Masara Mining Company* and *Paracale Gumaos Consolidated Mining Company*.

INDONESIA—Three diamonds of 3.5 carats each reportedly were found in Riam Kiwa Pengaron, Regency Bandjar, West Java.

TASMANIA—*Montana Silver Lead N.L.* has been granted a special prospecting license over an area of 7,000 acres adjoining its nickel-copper leases at Zeehan, 20 miles north of Mount Lyell. A geophysical survey now being made will be extended to the new area. Zeehan was formerly an important silver-lead field. It is not far from the lead and zinc deposits at Rosebery and Mount Farrell.

SOLOMON ISLANDS—The British Colonial Secretary, Alan Lennox-Boyd, reports that there is a revival of interest in the gold ridge area of Guadalcanal since the recent investigations by the Government Geological Survey. Further prospecting is being undertaken by an unidentified mining company.

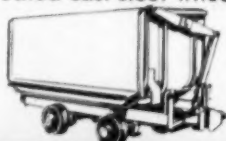
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VICTORIA—The Victorian Mines Department is currently test drilling what has been described as "vast" iron ore deposits at Nova Nova in East Gippsland, 215 miles east of Melbourne. Aerial and ground surveys have indicated that an area 15 miles by 3 miles could contain up to 100,000,000 tons of iron ore. These surveys were conducted by the Commonwealth Bureau of Mineral Resources. The Victorian department's testing is for a definite indication of the quantity and quality of the ore. One body of approximately 15,000,000 tons has given superficial sampling results of 50 to 65 percent iron. Other outcrops show 40 percent. Deposits of high quality limestone and unlimited tonnages of brown coal area available nearby. Ex-

periments have been under way for some time on the production of metallurgical coke from brown coal and results have been very encouraging. A pilot plant for metallurgical coke production is being imported from Germany. Discovery of iron ore in such an accessible location would be of far-reaching importance because Australia's present reserves, although high in grade, are limited and distant from supplies of coke and steel markets.

REPUBLIC OF THE PHILIPPINES—Gumaos Goldfields Inc. has acquired rights to 160 nickel claims on Homonhon Island off the coast of Samar. Gumaos has recently resumed operations after shutting down during war-time occupation. Previously it secured rights to 50

claims containing an ore reserve estimated at 25,000,000 tons.

NEW ZEALAND—The United Kingdom Atomic Energy Authority has withdrawn from the arrangement for production of heavy water from geothermal steam at Wairakei because a reassessment of costs shows them to be much higher than originally estimated. The New Zealand government is proceeding with its part of the project, production of electricity, and it is believed that abandonment of the heavy water plant will permit development of about 50 percent more power. Initial output will now be 65,000 kilowatts, and a further 40,000 kilowatts is planned. The first block of 20,000 kilowatts of power is expected to be available in 1958.

QUEENSLAND—Zircon Rutile Ltd. of New South Wales has formed a joint company with *Whale Industries Ltd.* of Moreton Island, Queensland, to explore for rutile and zircon on the island. Moreton Island is not far north of North Stradbroke Island where *Titanium and Zirconium Industries Pty. Ltd.* has its operations.

NEW CALEDONIA—Japanese interests reportedly are trying to obtain mineral concession in New Caledonia, and are willing to pay huge sums for the rights. Of particular interest are said to be the iron ore concessions held by an Australian, Edward Griffiths. Some offers have been rumored to run as high as \$3,000,000 for a few hundred acres.

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EUROPE

EIRE—Can-Erin Mines Ltd. of Toronto, Canada has been negotiating with officials of the Department of Industry and Commerce about the reopening of copper mines at Allihies, County Cork, which have been closed since the beginning of the century. The firm, reportedly, will guarantee to spend \$250,000 in prospecting work in the district. Another Canadian mining interest is said to be interested in prospecting in the Roaring Water Bay district of County Cork, and negotiations are under way here, too. *Irish Mining Corporation*, a subsidiary of Can-Erin, is prospecting at the old copper workings in Beaparc, County Meath, and also in County Monaghan.

SPAIN—Installation of a third furnace has been authorized by the Dirección General de Minas for the quicksilver plant at Castarás, province of Granada. The new furnace, like the others, will be of domestic design and construction. The plant treats mercury ore from the San Manuel deposits near Castarás.

EIRE—Irish Copper Mines, Ltd., subsidiary of *Mogul Mining Corporation*, reports that tests of the *Avoca* copper property which it is developing in County Wicklow have exceeded previous expectations. It now appears that the estimated 4,000-ton daily rate can be doubled when mining starts next year.

SWEDEN—Exports of iron ore in the first quarter of this year totaled 3,261,000 tons, compared with 2,930,000 tons in the same period of last year.

SPAIN—Several mining permits have been issued for development of iron ore in the Zaragoza mining district. One deposit, to be called *Nuestra Señora de la Purificación*, covers an extensive area over which there are 30 claims. The area extends around the Mocaya, near Olvega, where veins which were mined in Roman times have been worked again for the past two years. In Somaen and Velilla de Medinaceli to the south, shallow deposits of iron ore are still neglected.

ENGLAND—South Crofty, Ltd. reports that existing reserves above the 2,040-foot level on lodes from No. 4 lode southward are sufficient to maintain production for the next few years. Thereafter, future ore supplies must be looked for by developing westward in virgin ground between the South Crofty and Roskear shafts. This will be done by sinking below the 2,040-foot level at Cook's Kitchen Shaft in order to tap the No. 4 and other lodes at greater depth and by exploring these lodes north of the No. 4 lode from the 1,740-foot level downward. In all cases, length of payable ore can only be discovered by driving through barren or unpayable ground. At Castle-an-Dinas, where the company operates a wolfram mine, a geochemical survey from the South Shaft has disclosed no indications of further ore bodies of economical size in this area. At the north end of the property, a short length of ore stoped out above the 4th level is now being investigated by an intermediate level between the 6th and 7th horizon. The ore shoot has been reached and shows fair wolfram content but, as yet, it can not be predicted whether this discovery will lead to the re-opening of the north end of the property.

FRANCE—Production of industrial plutonium is expected to begin in France in 1958. M. Francis Perrin, High Commissioner for Atomic Energy, has submitted details of the process to be adopted to the Academy of Sciences. This process is similar to that for uranium, using trifluoride of plutonium obtained after a long series of operations with uranium bars set in a pile.

ENGLAND—Imperial Chemical Industries announces that it is no longer in a position to proceed with development of the deep potash deposits near Whitby, Yorkshire, and is willing to turn its information about the deposit over to any firm interested in deep mining. Some £400,000 have been spent to date on prospecting.

AUSTRIA—The new electrolytic zinc plant of *Bleiberg Bergwerks-Union* at Arnoldstein, province of Carinthia, which began operations in January, is now among the world's most modern zinc plants and produces refined zinc of 99.99 percent purity. Spain has requested the BBU to train Spanish zinc plant employees at this modern new plant and to do pilot runs on Spanish zinc ore. *Minera Celdran S.A.* reportedly plans to build a new Spanish zinc smelter and electrolytic plant with an eventual capacity of 20,000 tons annually, and the training program may be for this operation.

U.S.S.R.—The discovery of rich diamond fields in the Lena Basin of East Siberia has been announced. The discovery coincides with a vast expansion in the manufacture of precision tools and instruments in the U.S.S.R. for which diamonds are an indispensable raw ma-

Patent Applied For

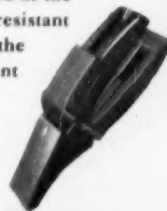
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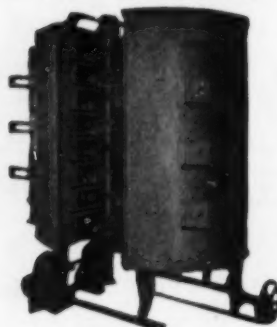
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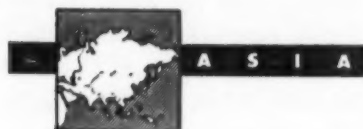
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terial. Until now, the Soviet Union had been conspicuously lacking in diamond resources, and apart from a minute output in the Central Ural Mountains, its needs had been met by imports. The Soviet Minister of Geology now claims that the recent discovery will satisfy all home requirements, and leave a surplus for export.

ITALY—The *Montecatini Company* produced 16,500 tons of zinc in 1955; the annual total for the country was 70,000 tons. The company also produced 18,300 tons of lead out of a total annual production for the country of 42,000 tons. Italy's total in aluminum and alloys was 71,700 to which Montecatini contributed 35,200 tons.

ENGLAND—Successful exploration at the *Greenside* lead-zinc mine near Lake Ullswater, Cumberland, during the last few years has added considerably to the life of the mine. The present workings extend over 4,000 feet on strike and some 1,400 feet below the main adit portal, while old workings run as far above the adit into the mountain. An interesting feature of this mine is the tailing disposal which is accumulated on a steep hillside about 1,000 feet from the plant. This results because nothing is permitted to be deposited in the valley below or to contaminate the lake. These steeply inclined dumps are not easy to control and, since the area is in a national park, experiments for establishing vegetation on the dumps have been carried out. Unfortunately, the material is almost sterile and any seeds are easily washed away, particularly since the rainfall is about 100 inches per year. In view of this, it was decided to build up humus and hydrated sewerage was spread on the slopes to enable vegetation to become established. The results have been very encouraging.

ITALY—Output of iron ore in 1956 is expected to reach 1,600,000 tons and in 1957 and subsequent years 1,800,000 tons. No further increase after 1960 or 1965 is possible, says informed European opinion. In 1955, Italy produced 1,300,000 tons of iron ore, as compared with 1,092,000 in 1954, 973,763 tons in 1953, and 790,237 tons in 1952.



MALAYA—Killinghall *Tin, Ltd.*'s experimental operations with the grab dredger, which were discontinued at the close of the last fiscal year, will not be continued, and the company will, in due course, dispose of the equipment. Meanwhile, other methods are being used to lengthen the life of the mine, including an attempt to find a way to recover the tin ore lying below the present maximum digging depth of the dredge. To accomplish this, some structural alterations are in progress on the dredge which will lower the water level of the paddock for experimental deeper digging.

INDIA—Nationalization of the *Kolar Gold Fields* appears to be inevitable, even though the Central Government is not anxious to spend large sums to secure ownership of what many consider to be dying gold mines, particularly when it is desirous of obtaining a large amount

of foreign assistance for a second Five-Year Plan. However, the government of Mysore State is determined and reportedly plans to set up an autonomous corporation to work the mines after nationalization. It will attempt to retain the services of the technicians and other staff members, but it is debatable how many would stay under nationalized policies. The representatives of the mining companies involved are seeking between £4,500,000 and £6,000,000 compensation; the Mysore government had planned to offer only the stock market quotations on a certain date in 1955 before nationalization was first discussed. Much technical advice has been given about the state of the mines' reserves. Many of the geologists believe that the mines have reached a state of diminishing return; they are already the deepest

gold mines in the world, and technically, the most difficult to operate.

BURMA—Previous exploration of the *Soughkeng* zinc mines had estimated that there were about 35,000 metric tons of ore in the mine, containing 40 percent metallic zinc. Further exploration by the Burma government through the *Mineral Resources Development Corporation*, has proved much greater reserves. Contractors expect to mine 70,000 tons of ore this year, and it is reported that 200,000 tons have already been mined. A 28-mile, all-weather road has been opened to the mines. It is expected that the government will seek foreign finances through joint venture schemes to develop these deposits.

JAPAN—The Mikkaichi mill of *Mikkaichi Smelting Company* went into pro-

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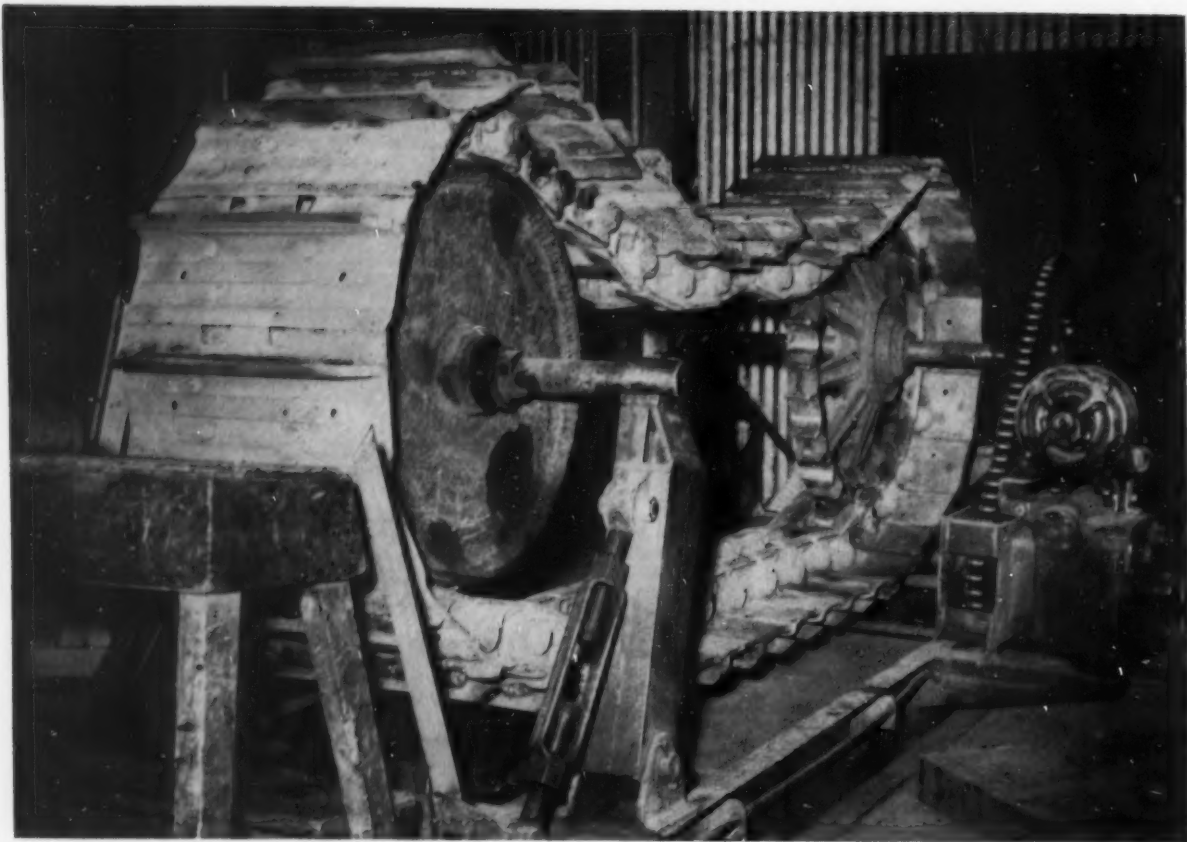
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In order to keep their tractors moving, the shop has in stock spare tracks for replacement; when grousers are worn, the track is taken off the crawler and sent to the shops, the replacement assembly is supplied and the tractor goes back to work. The old track is mounted on

the fixture shown above and, as time permits, the shop weldors handle the rebuilding job. The fixture has a conventional idler and sprocket on which the track is mounted, the device being adjustable to handle a track assembly of varying length. The sprocket is power driven through a gear reducer.

The assembly is rotated so that a weldor can work on grousers at either end, welding in down hand position. The worn grouser is squared up by a cutting torch and steel bar stock, $\frac{1}{2}$ " x $1\frac{1}{4}$ ", is welded on with high tensile electrodes. After the bar is welded in position a single heavy stringer bead of Stody Self-Hardening is run across the top

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duction in January of this year with a capacity of 500 metric tons of distilled zinc metal per month. This plant will be enlarged to 1,000 tons by the end of the year. Mikkaichi is a joint venture of the *Nippon Mining Company* and *Nichitsu Mining Company*.

MALAYA—*Larut Tin Fields Ltd.* produced 913.93 tons of tin concentrates last year, compared with 939.94 tons in the previous year. The firm does not see any prospects for locating a new mining property for the No. 4 dredge within the near future, but *Anglo-Malayan Development Ltd.* continues to search for additional reserves for the dredges under this group's management.

INDIA—*Indian Aluminium Company Ltd.* reported a good year in 1955. The expansion at Alupuram enabled the smelter to operate at a new capacity of 5,000 tons of ingot per annum, thus increasing output from 2,945 tons in 1954 to 4,863 tons in 1955. During the last quarter the smelter was actually producing at a rate of 5,400 tons annually. Bauxite and alumina production managed to meet these increased requirements. The bauxite and alumina facilities at Bagru Hill and Muri will be expanded because of the proposal to increase capacity at the new 10,000-ton Hirakud project to 20,000 tons.

JAPAN—The Japanese steel production goal for the fiscal year 1956 is 7,500,000 tons. To meet the increased production, Japan plans to import about 400,000 tons under a long-range contract from Hainan Island this year. Iron ore imports in 1956 are as follows: from the Philippine Islands, 1,770,000 metric tons; Malaya 2,050,000 metric tons; Hong Kong 140,000 metric tons; India 1,200,000 metric tons; Goa 800,000 metric tons; other areas, including Hainan Island, the United States, Korea, etc., 1,340,000 metric tons.

BURMA—The Union of Burma has awarded two contracts totaling about \$200,000 to the Armour Research Foundation of Illinois Institute of Technology, Chicago, for greater development of the country's resources. The contracts provide for expansion of the Union of Burma Applied Research Institute at Rangoon, and metallurgical and mineralogical research. The most promising areas of metal research will be in lead, silver, and antimony. The metallurgical research program will include training of a local research staff. Field direction of this will be under Dr. Stanley M. Baxter, ARF metallurgist.

JAPAN—According to the Titanium Society, titanium slag output will be tripled this year, rising from 5,675 metric tons in 1955 to 15,350 metric tons. A breakdown of the figures follows, with last year's figures in parenthesis: *Morioka Denka K.K.* 2,400 (1,470); *Hokuetsu Denka K.K.* 4,250 (1,597); *Tohoku Denka K.K.* 3,100 (—); *Nisso Seiko K.K.* 3,970 (1,279); *Osaka Titanium K.K.* 1,630 (1,329).

INDIA—The Government of India has signed a three-year trade agreement with Poland. India will buy from Poland 300,000 tons of iron and steel products, ending December 31, 1958, and will send to Poland an equal quantity of iron ore during the same period. India will also buy 100,000 tons of cement between August 1956 and March 31, 1957.

KOREA—New rules governing production and sale of tungsten concentrates

have been announced by the Ministry of Commerce and Industry. Small-scale tungsten miners are exempt from previous limitations, but *Korea Tungsten Mining Company*, the country's largest tungsten producer, is still governed by the restrictions. Korea Tungsten Mining has been released from acting as official export agent but will continue to supervise assaying and packing in order to maintain high quality standards. The notice also provides that tungsten ore will be exported only to Free World nations.

JAPAN—The Geological Survey Institute will undertake a 300,000,000 Yen nationwide aerial survey for uranium. The program will take about three years to complete after approval is obtained from the Atomic Energy Commission. Planes will be equipped with scintillation counters. The Geological Survey is a part of the Ministry of International Trade and Industry. Last year it successfully prospected by plane in the prefectures of Okayama and Tottori. Besides these two areas, uranium deposits are believed to exist in the mountainous districts of Niigata, Fukushima, Toyama, and Gifu prefectures.

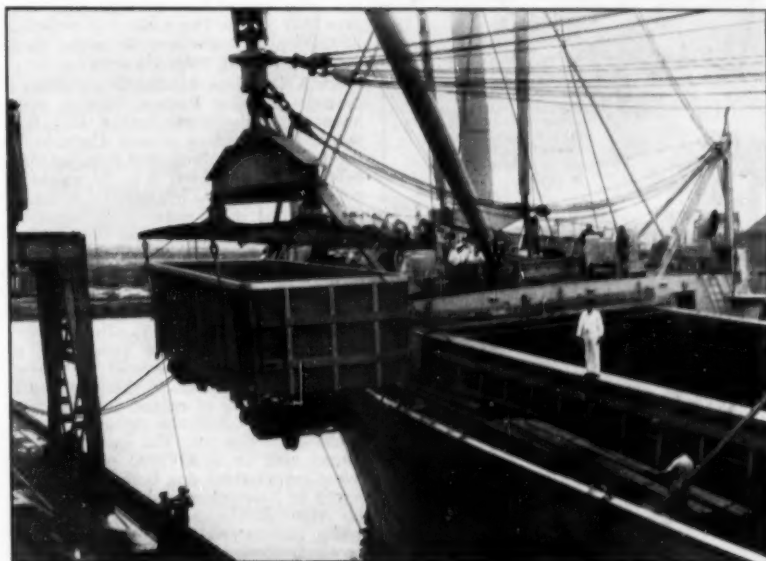


BOLIVIA—*Glenn McCarthy Inc.* has completed a contract with *Chile Ex-*

ploration Company, an *Anaconda Company* subsidiary, which calls for furnishing of natural gas from Bolivian fields for the Chuquicamata operation in Chile. The oil and gas concessions are owned by *McCarthy de Bolivia*, a wholly owned subsidiary of *Glenn McCarthy, Inc.*, and are located in the Chaco district of Bolivia. Another subsidiary would be formed, *Andes Pipeline Corporation*, to construct a 500-mile pipeline through a pass in the Andes Mountains at an elevation of about 14,500 feet. Procurement of government permits is necessary before any construction can be undertaken. The contract with *Anaconda* is a purchase contract which would be confirmed only when *McCarthy* is able to make deliveries.

MEXICO—*Minerales y Metales Industriales*, a subsidiary of *Pennsylvania Salt Manufacturing Company*, has completed its first full year of fluorspar mining in the San Luis Potosi area. Largest of its type in Mexico, this mine produces metallurgical grade ore used as a flux in the making of open-hearth steel. In April, through its subsidiary, the *Pennsalt International Corporation*, the parent company imported the first shipload of fluorspar from these operations. The initial cargo of 4,400 tons was trans-shipped from the Port of Philadelphia to *Bethlehem Steel Company* plants at Johnstown, Steelton, and Bethlehem, Pennsylvania.

BRAZIL—*Harbison-Walker do Brasil*, subsidiary of the *Harbison-Walker Refractories Company* in the United States, is studying the technical and financial details of a project designed to establish



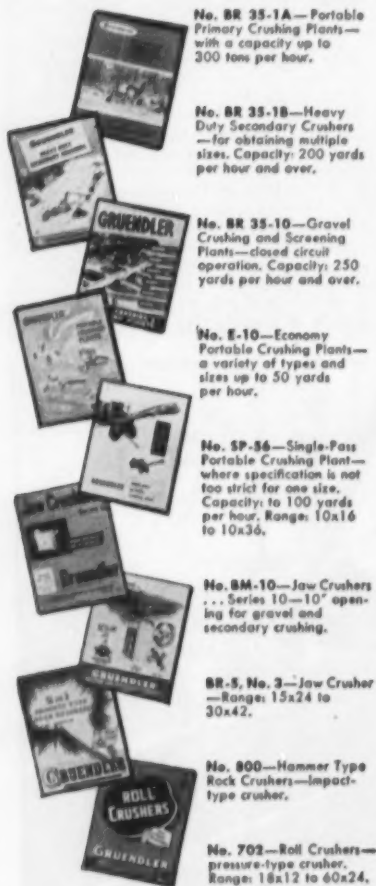
Aluminum Gondola Cars for Kaiser Bauxite

A cargo of large mining and railroad equipment, representing an unusual heavy-lift operation, has been shipped to Kaiser Aluminum & Chemical Corporation's bauxite mining operations on Jamaica. Pictured above is an aluminum gondola car loaded aboard the Norwegian motor vessel "Belacean" at Baltimore, Maryland. This is one of 35 all-welded aluminum gondola cars, the first such cars to be built in the United States. Through the use of aluminum and improved design, the new cars, supported by the same standard steel trucks, will have an increased payload of 14 tons per car over conventional steel gondola cars now in use. Each weighs 19 tons and will carry 84 tons of bauxite compared with 70 tons per steel car. Also shipped were two 120-ton, Baldwin-Lima Diesel-electric locomotives and a five-yard Marion power shovel. Other new capital equipment for Kaiser Bauxite Company, already shipped or to be shipped, includes thirteen 15-ton Euclid trucks, four Caterpillar tractors, additional railroad track, and conveyor equipment.

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CUBA—Owners of the *Isabel Rosa* copper mine near Pinar del Rio are reported to be planning a \$1,000,000 expansion program, including construction of a pilot plant. The plant will process minerals from the Isabel Rosa mine and also from others nearby. Plans call for the plant to produce electrolytic copper, refined 100 percent; to process iron sulphate; and to extract sulphur and silica.

MEXICO—Tin deposits recently discovered near Coneto de Comonfort, Durango, are soon to be mined by *Mina Mex, S.A.* of Durango City, in cooperation with *Chain Mill, Inc.* of Denver, Colorado. The deposits are also reported to contain values in silver, gold, and mercury. The two firms have completed a 45-mile road to the railroad at Potrillo, and a landing field for freight delivery by plane. A 30-ton-per-day treatment plant is to be installed.

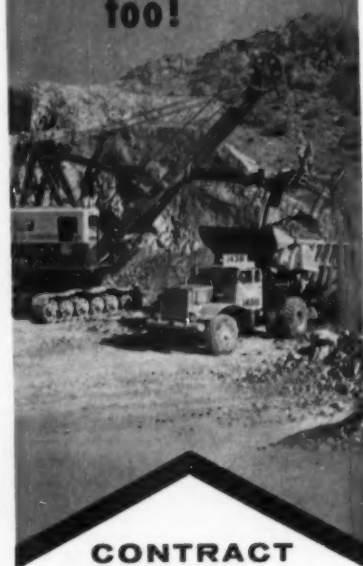
BRAZIL—The *Wah Chang Corporation* is reported to be planning to invest \$5,000,000 in the development of tungsten deposits in the state of Rio Grande do Norte.

DOMINICAN REPUBLIC—*Falconbridge Nickel Mines Ltd.* is investigating the possibilities of lateritic nickel silicate ore in the Republic, reflecting increasing interest in recovery of nickel from these ores on a commercial basis. R. B. Anderson, president of Falconbridge, says these ores may yet be the subject of sufficient metallurgical know-how to make them competitive with sulphide ores.

MEXICO—Jose Aguilar is installing a cyanide plant at Panuco, Sinaloa state, about 60 miles northeast of Mazatlan, where he has many claims. Capacity of the mill will be about 200 tons per day; average assay is from 6 to 20 grams of gold and about 150 grams of silver. Mr. Aguilar also operates some gold-silver mines at Ventanas in the state of Durango.

PERU—*Cerro de Pasco Corporation* reports that tonnage of ore mined at all of its properties in 1955 increased 15 percent over that of 1954, and 30 percent over that of 1953. Production of copper, including some sold as blister, was 19 percent higher than in 1954, while production of refined lead reached a total of 130,450,000 pounds, an increase of 3 percent. The production of refined zinc at 37,877,000 pounds was below expectations due both to a lack of power in December and to a delay in the zinc development program. Difficulties encountered in the operation of the electrothermic zinc plant are expected to be overcome by modifications which should be completed by the end of 1956. Meanwhile, the capacity of the electrolytic plant is being expanded to 90 short tons per day. Construction is scheduled for completion in mid-1956 and the combined plants, which complement each other technologically, are expected to attain full production in 1957 soon after the Paucartambo hydroelectric plant, now under construction, is completed. Plans for further expansion of the zinc facilities will be completed when sufficient experience has been had with the operation of these two plants.

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MINING WORLD

MEXICO—A sharp increase in applications for concessions to mine barite is reported by the Mexican Bureau of Mines. Most are for operations in the mountains of Puebla and Oaxaca. Two filed by the *La Platina Mining Company* seek the right to mine barite in the Tecomaxtlan region of Puebla state.

CUBA—A new Company, the *Fan-Cuba Oil and Metals Corporation*, has been formed in New York to explore for petroleum and minerals in Cuba. Officials of the firm are Walter E. Seibert, president; Walt Dobbs vice president; and William G. Mulligan, vice president and treasurer.

MEXICO—*Santa Fe Western Gas & Uranium Corporation* of Albuquerque, New Mexico is reported to have signed an agreement to explore and develop 4,000 acres of potential copper deposits in the Yakui Indian Reservation in Sonora, Mexico.

BRAZIL—The Ministry of Agriculture has approved plans for erection of a pilot plant in the laboratories of the Bureau of Mineral Production to test a new process for extraction of copper electrolytically. The lab will use ore from the *Seical Mines* in Rio Grande do Sul and also from the *Caraiabas Mines* in the state of Bahia. These represent the most important occurrences of copper ore in Brazil.



AFRICA

GOLD COAST—The recent strike of African mine workers caused a set-back in the plans of *Ashanti Goldfields Corporation, Ltd.* The equipping of the new Eaton Turner shaft which was completed to its final depth of 4,300 feet last August will have first priority, but this will not be possible until toward the end of the year. Before the strike it was intended to increase output during 1956 to 18,000 ounces monthly from 25,000 to 26,000 tons milled, but in view of the serious loss in production this cannot be achieved in the ordinary ways and steps are being taken to increase the proportion of ore from the richer section of the mine. This procedure will not seriously affect the resources of the mine because sufficient high-grade ore has been blocked out to justify this course of action. During April of this year, high gold values were located on the Cote d'Or reef crosscut on the 20th level. The reef width is 14.5 feet with an average assay of 39.8 dwts. gold per ton.

FEDERATION OF RHODESIA & NYASALAND—The Gwelo lithium carbonate plant, which was closed for installation of additional units, has now been reopened with trebled capacity. The raw material, petalite, is obtained from the now famous deposit at Bikita.

EGYPT—The *Sinai Mining Company Ltd.* is carrying on an extensive exploration program for manganese deposits on its property. An aerial tramway is under construction from the company site to the port of Abu Zenima on the Gulf of Suez. It is to be completed this year, and a second aerial tram is planned for completion in 1957.

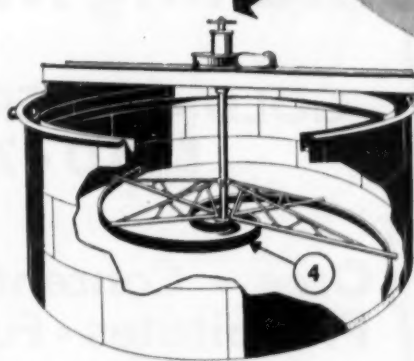
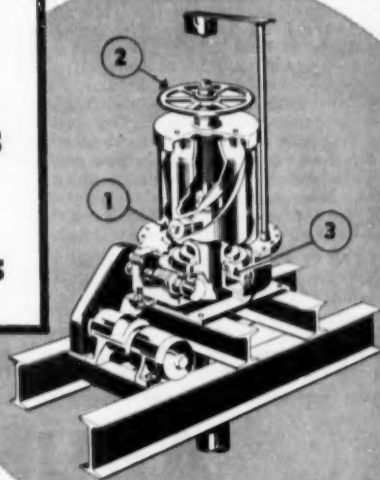
KENYA—The new processing plant at the *Macalder-Nyanza* mine, owned by *Colonial Development Corporation*, has now gone into production. The roast-leach plant will produce cement copper for final treatment at *Kilembe Mines* smelter which is being built across Lake Victoria, at Jinja, Uganda. First shipments will start in September. Macalder-Nyanza's full-scale production is planned to be 10,000 tons of ore per month, with an expected recovery of about 2,500 tons of copper, 10,000 ounces of gold, and 75,000 ounces of silver annually. Work has also started on a hydro-electric plant on the Kuja River which is expected to generate power early in 1957; meanwhile, the mine will continue to operate on Diesel power.

NIGERIA—*Bisichi Tin Company (Nigeria) Ltd.* has decided to purchase a number of properties in Nigeria in order to augment ore reserves and thus lengthen the life of the mine. Provisions for financing development of these properties is now under consideration. There is a certain amount of urgency to this project because some depletion of ore reserves is being observed. Re-drilling of some of the company's leases is now proceeding.

EGYPT—Deposits of uranium and thorium are said to have been located in Egypt. Laboratory tests are now being made to determine which of the deposits can be economically developed for atomic energy purposes.

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MOROCCO—The *Kirkland-Hudson Bay Gold Mining Company* of Canada is reported to have purchased all of the shares of *Compagnie Minière de Menizla*, a French-Moroccan concern with numerous metal ore mining concessions in southern Morocco. The company has already started prospecting in the desert regions south and east of Agadir and plans to start drilling operations soon. Another Canadian-financed company, *Canada-Morocco Mining Company*, has picked up an option on 250 mining concessions totalling 2,000 square miles. These concessions are scattered over various regions of Morocco, notably in the Grand Atlas Mountains in the south-east.

SIERRA LEONE—The Legislative Council has ratified an agreement with the *Sierra Leone Development Company* for mining of iron ore in the Tonkolili district. The five-year project is expected to cost about £15,000,000. Included in the development program is extension of the present railway an additional 73 miles. It presently connects the firm's mine at Marampa with Pepel. The river from Freetown to Pepel will be dredged to permit access of larger ships. The new mine is expected to produce about 10,000 tons of ore per day; about 5,000,000 tons is expected to be shipped annually from the company's two mines.

FRENCH EQUATORIAL AFRICA—*Pacific Tin Consolidated Corporation*, predominantly a tin producer in Malaya, has entered into a lease and royalty agreement with *Compagnie Minière de l'Oubanghi Oriental* to explore and develop diamond areas in French Equatorial Africa.

Approval of the French government is necessary before the project can be undertaken. The project will involve the development of modified recovery methods, as well as extensive exploration work.

EGYPT—It is reported that the Egyptian cabinet has accepted plans for construction of a zinc plant and an aluminum plant presented by the National Production Council. The Egyptian Production Minister recently visited East Germany and is reported to have arranged for East German technical aid and machinery. The proposed zinc refining plant would have an initial annual capacity of 6,000 tons, later being expanded to 20,000. It would cost about 2,500,000 Egyptian pounds to build, and payment to East Germany for the equipment would be made in metal deliveries. Egypt's zinc ore is said to have assayed between 20 and 25 percent metal content. No details of the aluminum plant were revealed.

UGANDA—The railway extension from Kampala to Kanese on the border with the Belgian Congo is reported to have been opened recently. The *Kilembe Mines Ltd.*'s copper-cobalt property is about 30 miles from Kanese, and so this extension will provide transportation for the mine's output, among other things. The extension links the area with the rail system to Mombassa.

UNION OF SOUTH AFRICA—*Transvaal Consolidated Land and Exploration Company Ltd.* has acquired a controlling interest (75 percent) in the newly registered *Winterveld (T.C.L.) Chrome Mines Pty. Ltd.* to which it has ceded operating

rights over chrome areas in the Lydenburg district. The *Johannesburg Ore Company* has ceded its railway truck quota to the *Winterveld company*, in which it has the remaining 25 percent interest. The deposits are presently under development. Another associate company, *Platinum Prospecting Company (Pty.) Ltd.*, has continued underground exploration of its *Brakspruit* property; treatment of the ore is being investigated.

SWAZILAND PROTECTORATE—The value of minerals production increased to £2,355,909 in 1955 from the 1954 output of £2,113,912, mainly due to the expansion of asbestos production. Chrysotile asbestos rose from 30,142 short tons in 1954 to 32,613 short tons in 1955; metallic tin output was 38.7 short tons in 1954, and 30.44 short tons in 1955; barite production totaled 361.77 short tons in 1954 and 449.12 in 1955. So far, barite has been produced by quarrying near-surface ore which has yielded a dirty-white product because of the presence of iron oxide. A start has now been made in mining the barite vein from an adit, which is being driven into the ore body. In 1955 exploration of the *Bomvu Ridge* iron ore deposit was continued, and the preliminary investigations of the radioactive zone in the *Moodies Formation* was conducted. Drilling results from the *Bomvu Ridge* operation indicated probably iron ore reserves of 32,000,000 tons and prospective reserves of 30,000,000 tons. The average grade was 64.56 percent iron.

UNION OF SOUTH AFRICA—*West Rand Consolidated Mines Ltd.* completed sinking of its *Monarch* shaft by Decem-

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ber 24, 1955. The final depth was 3,419 feet, and some preliminary work on stations was completed during this time. Five world's records were established during this operation: 3,237 feet were sunk in 152 days; 2,323 feet were sunk in 100 consecutive shifts, i.e. August 1 to November 9; 2,153 feet were sunk during the calendar months of August, September, and October; 1,487 feet were sunk in the calendar months of September and October; and 763 feet were sunk in the 30 days of September. The Monarch is a vertical, rectangular unit, 20 by 11½ feet, with three compartments.



NORTH AMERICA

ONTARIO—A sharp increase in ore reserves has led *Tenagami Mining Company* to revise its plans for a 1,000-ton mill. The new mill will now be designed for a 2,000-ton-daily capacity, and construction is expected to start by the end of this year. While there is still some drilling to be completed, it appears that there are about 4,500,000 tons of copper-nickel ore averaging at least 1.5 percent, in addition to 575,000 tons averaging 3 percent, and some 50,000 tons of massive chalcopirite with a grade reportedly of better than 20 percent. Total reserves are expected to exceed 5,000,000 tons. Open-pit operations are being conducted No. 1 and 2 lenses. Shaft sinking operations are underway to a depth of 600 feet; two levels will be cut—at 400 and 500 feet.

QUEBEC—*Eastern Smelting & Refining Company, Ltd.* has completed the main power dam at Chicoutimi where it plans to construct a nickel-copper smelter and refinery, along with a power plant. Site of the furnaces and converters has been cleared. The company hopes to have the power plant in operation by spring of 1957, and the smelter by the winter of 1957-1958. Initial production plans being considered are for 15,000,000 pounds of metallic nickel and 100,000,000 pounds of copper annually. The nickel output would involve an estimated 83,000 tons of concentrates a year. About eight years of smelter feed are believed to be available through companies affiliated with the Mogul Mining Corporation, also a part owner of Eastern. Indicated reserves would provide another 11 years of mill feed, and inferred reserves an additional 20 years.

ALASKA—Development of the reportedly rich Klukwan iron ore deposit is nearing reality. The council of the Chilkat Indian village has approved the lease of its land to *Klukwan Iron Ore Corporation*, a subsidiary of *Quebec Metallurgical Industries, Inc.* of Toronto. The 320 acres of land involved were set aside by the Federal government in 1943 as an administrative reserve for the benefit of the Klukwan village. Another 234 acres included in the transaction are owned by Mary Whittaker of Klukwan and Peter Duncan of Hoonah. This land is located 22 miles up the Chilkat River from the city of Haines. Next step for the firm is various negotiations with the Federal government as these areas involve reserve land. Among the major provisions of the lease agreement are the

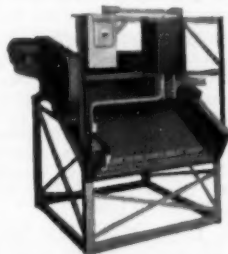
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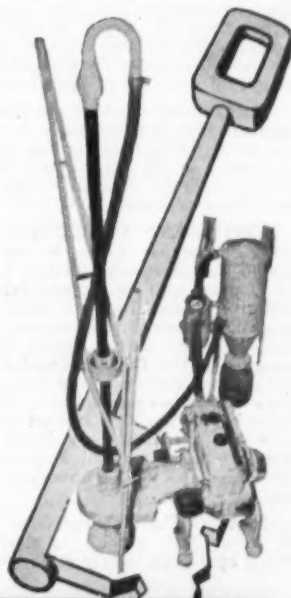
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following: possession remains with the natives, except to the extent needed by the company for actual mining, exploration, and maintenance of mining facilities; natives to be given preference in employment and on-the-job training; water supply and access road to Klukwan village to be protected by the company; lease of the reserve is for 10 years, and as much longer as minerals are produced. The lease provides for a stipulated annual rental, plus royalties.

NORTHWEST TERRITORIES—*North Rankin Nickel Mines Ltd.* has resumed mining operations on the west shore of Hudson Bay, 320 miles north of Churchill, after a 1½ year shutdown. The shaft and underground workings have been dewatered and stope preparation is underway. A 250-ton mill will be erected this year, and the mine is expected to go into production in early 1957. Estimated ore reserves are 460,000 tons of average grade 3.30 percent nickel, 0.81 percent copper, and 0.03 ounce platinum to the 300-foot horizon.

ONTARIO—*Frobisher Limited* has optioned the *Glacier Creek* copper property at Barbara Lake in the Beardmore lithium area. Electromagnetic and magnetometer surveys are being carried out by *McPhar Geophysics*.

GREENLAND—Concentrates are being stockpiled at the *Mesters Vig* lead and zinc mine in East Greenland until the two-month navigation season arrives. Shipments will then be made to Denmark for smelting. Proven ore reserves amount to 560,000 tons grading 20 percent combined lead and zinc. Some exploration work is still going on. Production is expected to be on a 20,000-metric-ton annual basis. *Northern Mining Company* is the operator.

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QUEBEC—The *United States Steel Corporation* is reported to be investigating, through a subsidiary—*The Cartier Mining Company, Limited*, a large, low-grade, iron ore property in the Mount Reed-Mount Wright area 125 miles north of Shelter Bay. Actual extent of the deposits has not been determined; preliminary surveys have indicated the grade is about 30 percent.

SASKATCHEWAN—*Gunnar Mines Ltd.* will increase capacity of its 1,400-ton-per-day mill to 1,650 tons by the end of this year. The firm is also seeking a second contract with the *Eldorado Mining & Refining Company* to cover sales of uranium concentrates to 1962. The present contract expires in October 1960. There appears to have been no change in the ore situation since last year because no development work has been done; however, a shaft which will mine ore below the 400-foot level is now down to 750 feet. Present operations are by open pit and this will be mined to a depth of 410 feet.

BRITISH COLUMBIA—*Newkirk Mining Corporation* is diamond drilling the *Indian Chief* copper property on Vancouver Island held under option by *Moneta Porcupine Mines* (70 percent) and *Buffalo Ankerite Mines* (30 percent). If results are satisfactory, a new company will be formed financed jointly by *Newkirk* and the *Moneta-Buffalo Ankerite* group on a 50-50 basis.

ALASKA—*Hobb Enterprises Inc.* of Spenard is moving equipment in to work ground on *Slate Creek* in the upper Chistochina country. Equipment includes three D-8 Caterpillar tractors and a dragline.

BRITISH COLUMBIA—*New Jersey Zinc Explorations Ltd.* has acquired a large group of copper prospects near Lockport on the east coast of Moresby, the second largest of the Queen Charlotte islands off the coast of British Columbia.

ALASKA—Mining on *Faith Creek* this summer, *Bob Watkins* plans to operate two shifts. He is lining up his crews for the coming season and will have one crew mining while the other is clearing ground for further operations.

NORTHWEST TERRITORIES—*Nordain Exploration* plans to undertake ground electromagnetic surveys, followed by diamond drilling, immediately after spring break-up. The work will be done to confirm anomalous occurrences outlined by aerial surveys on the 36-claim property in the *Indian Mountain Lake* area about 120 miles east of Yellowknife. The company has also staked another 150 claims in the *Pine Point* area on the south shore of *Great Slave Lake* which is believed to be a potential lead-zinc producer. This, too, will be investigated after break-up.

ONTARIO—*Panel Consolidated Uranium Mines Ltd.* expects to start shaft sinking operations shortly on its property

in the Algoma district of northern Ontario. No. 1 shaft will be a six-compartment opening and will be sunk to a depth of 1,000 feet, while No. 2 shaft will have three compartments and will bottom at 1,250 feet. *General Engineering Company Ltd.* is general contractor for *Panel* and is proceeding with plans for a production plant.

BRITISH COLUMBIA—A new company, *Acallin Mines Ltd.*, has acquired 48 claims, including the old *Panther* copper workings on *Texas Creek*, south of the *Nitinat* River on *Vancouver Island*. Diamond drilling of an anomaly is planned. Another new B.C. Company is *Northern Gem Mining Corporation Ltd.* which has arranged to purchase the *Little Gem* cobalt-gold-uranium property on *Roxy Creek* in the *Bridge River* district, and plans to extend a tunnel along the favorable zone.

NORTHWEST TERRITORIES—*Newmont Mining Corporation of Canada* is conducting a geophysical survey on a nickel prospect near the west coast of *Hudson Bay*. Outcome of this phase will determine whether any diamond drilling will be carried out. The field season for this year also includes detailed examination of two properties acquired last year just before the winter set in. One is a copper prospect in the *Yukon*, about 40 miles northwest of *Watson Lake*; the other, also a copper prospect, is known as the *Lehto* group and lies about 30 miles north *Granduc* in northern B.C.

NEWFOUNDLAND—*Frobisher Ltd.* and *British Newfoundland Corporation* plan work on their uranium concessions in *Labrador* this summer season. The *Brinco* claims cover 2,000 to 3,000 square miles in a block along the *Labrador* coast northeast of *Goose Bay*. The *Frobisher* concession, approximately 300 square miles in area, lies south and west of the *Brinco* ground. Both have found radio-active indications in preliminary work.

QUEBEC—*Newlund Mines Ltd.* plans an active exploration season in the *Chibougamau* copper mining area where it has interests in 457 claims in 10 townships. *Newlund* will also participate in formation of a new company—*Yorcan Explorations Ltd.*—which will explore a 95-claim block in the area, made up of former *Newlund* and *Chibougamau Mining & Smelting Company* claims. *Newlund* will have a 25 percent interest, *Chibougamau* 50 percent, and *New York and Honduras Rosario Mining Company* 25 percent. Also being formed is *Roycam Copper Mines* for another *Newlund's* properties—the 50-claim group in *Roy* township.

GREENLAND—Uranium and thorium deposits are reported to have been located through investigations undertaken at the initiative of the *Danish Atomic Energy Commission*. Also cooperating were the *Greenland Geological Investigation Office*, the *Danish Navy*, and the *Defense Research Council*.

BRITISH COLUMBIA—Geochemical prospecting was started recently at the *Highland Valley* copper prospect of *Salmo Prince Mines Ltd.*, following construction of an access road and camp. Work is financed by *Newkirk Mining Corporation Ltd.* Also probing a newly located copper ore body some 3,000 feet north of the original ore body is *Commercial Minerals Ltd.* This firm is working on its 100-claim property south of *Kamloops*.

Watch the September issue
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MINING WORLD

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Mount Lyell

Continued from page 59 (WM43)

("North Lyell" tunnel) 9 feet square in section and 7,000 feet long, including branches to the North Lyell, Crown Lyell, Royal Tharsis, and Lyell Tharsis mines. Grade is 1 in 200. West Lyell ore is hauled 1.0 mile to the concentrator in 10-ton, hopper bottomed cars of 2 feet gauge drawn by electric locomotives.

An entirely new tunnel is being driven 3,800 feet to co-ordinate with the installation of the new crusher.

The concentrator is easily the largest in Australia. Procedure is clearly shown on the flow sheet. A number of features call for comment. The crushing plant has reserve capacity but an additional 5,000-ton fine ore bin is necessary and under construction. Equipment is on order to increase the fine grinding section to 2,000,000 tons capacity per year.

Table No. IV
Consumption of Grinding Media and Reagents at Mount Lyell Mining and Railway Co., Ltd., Queenstown, Tasmania for 1955

Item	Quantity
Primary mills ¹	1,091
Secondary mills ¹	2,358
Aerofloat ²	0.117
Lime ²	2.41
Aerocyanide ²	0.056
Cresylic acid ²	0.015
Xanthate for pyrite flotation ^{2,3}	1.08

1. Pounds of balls per ton of ore.

2. Pounds per ton of ore.

3. Wet.

Noteworthy are the Forrester cells, which give satisfactory recovery and low maintenance costs. Power for pneumatic agitation is not expensive.

A number of recent innovations have improved mill performance and recoveries.

A variable speed gearbox has been incorporated in the Ross chain feeder drive to determine the optimum speed for continuous operation, thus maintaining a constant and full tonnage on subsequent crushers and conveyor belts. Installation of an additional Symons shorthauler crusher over that shown in the flow sheet caused a reduction in consumption of 4-inch steel balls. Due to a scarcity of 2-inch forged steel balls, an increasing proportion of cast iron balls is being used in the ball mills. From 37 percent cast iron in 1953, the proportion climbed to nearly 80 percent in 1955, with an increase in consumption of 0.252 pounds per ton of ore. Rubber coating of classifier blades has proved economical in the fine grinding section.

Concentrator performance figures are shown in Table Nos II, III, and IV.

More pyrite can be recovered if demand warrants. There is already a

Table No. V
Smelter Raw Materials and Products at Mount Lyell Mining and Railway Co., Ltd., Queenstown, Tasmania for 1955

Product	Cu	Fe	PERCENT S	SiO ₂	CaO	Al ₂ O ₃
Concentrate	23.7	33.5	35.1	—	—	—
Matte	37.6	37.2	24.2	—	—	—
Furnace slag	0.56	45.7	—	27.4	5.1	4.5
Flue dust	24.0	33.5	19.4	—	—	—
Converter slag	3.0	55.4	—	22.0	—	—
Blister copper	99.2	—	—	—	—	—

mine stockpile of 100,000 tons.

Smelter

Smelting practice is unusual, for, despite several alterations in technique since the days of pyritic smelting, a blast furnace has been retained for matting concentrate without prior sintering. The primary objective is production of matte with a grade (37 to 42 percent copper) such that anode scrap from the electrolytic refinery may be melted directly in the converters.

Copper concentrate is pumped 1,100 feet from mill to smelter for filtration. Flue dust from the blast furnace is also delivered to the filter plant after collection and pulping with water. The wet concentrate-flue dust mixture (12 to 15 percent moisture) is smelted with converter slag, limestone, and silica, using coke which has to be shipped from Port Kembla, New South Wales, 700 miles away.

A high proportion of flue dust is produced by the blast furnace (18 to 20 percent of burden). It is collected in a 10-foot-diameter cyclone followed by a system of filters made from closely compacted steel wool. A Cottrell installation is unnecessary, 95 percent of the flue dust being recovered in this way.

Officers of the Mount Lyell Company have fully investigated alterna-

tive processes overseas for treatment of the concentrate.

Cost of coke, including transport, is very high and possibilities appear to be:

- Some form of electric smelting.
- Fluosolids roasting and electro-winning.

Matte is converted to blister copper in Great Falls type converters. Blast furnace slag is granulated and, like flotation plant tailing, is conveniently disposed of by laundering to the fast-running Queen River nearby.

Smelter copper recovery is high at 96 to 97 percent. Table No. V shows typical analyses.

Refinery

Anodes are cast on a straight line casting machine. Due to the satisfactory purity of blister copper (see Table No. VI) the low cost of electric power, advantages of refining blister electrolytically outweigh the disadvantages. Practice is summarized in Table No. VII.

Nickel content of the electrolyte requires control and bluestone for Tasmanian sale is produced as required.

About two-thirds of cathode production is shipped to The Electrolytic Refining and Smelting Co. of Australia Proprietary Ltd. at Port Kembla, New South Wales for casting into market shapes.

Acknowledgement

The author is grateful to Mount Lyell Mining and Railway Co. Ltd. for access to its plant and records and for permission to publish this paper.

In the introduction to "The Peaks of Lyell" Mr. Geoffrey Blainey states: "To the best of my knowledge, Mt. Lyell is the first company in Australia to make available all its records for historical research." This notable policy continues.

Table No. VI
Analyses of Electrolytic Copper Refinery Products at Mount Lyell Mining and Railway Co., Ltd., Queenstown, Tasmania for 1955

Product	Cu	As	Fe	PERCENT Sb	Ni	Pb	Se	Te	S	OUNCES PER TON Ag	Au
Anodes	99.21	0.004	0.053	0.015	0.025	0.014	0.021	0.006	0.158	3.3	0.595
Cathodes	99.964	0.0001	0.0089	0.0002	0.0002	0.0023	0.0014	—	0.0046	0.082	0.007
Slime	77.1	0.11	0.21	0.14	0.07	0.35	2.01	0.30	10.8	205.3	36.2

Table No. VII
Electrolytic Copper Refinery Operating Data at Mount Lyell Mining and Railway Co., Ltd., Queenstown, Tasmania

Item	Commercial	Stripper
Number of cells	128	24
Total current (amperes)	7,000	10,000
Current density (amps./ft. ²)	21 to 30	13 to 15
Current efficiency (percent)	93	93
Voltage per cell	0.4	0.45
Power efficiency	\$5.00-4.24 lbs.	copper/K.W.H.D.C.
Anode weight (lbs.)	550	650
Anode spacing (centers)	5½ inch	5¼ inch
Anode life (days)	23 to 16	32
Cathode period (days)	3 to 5	1
Anode scrap (weight percent)	13	13

U.S.A. Metal & Mineral Prices

METALS

June 15, 1956

COPPER:	Electrolytic. Delivered F.o.b. cars, Valley basis	46.00¢
	Lake. Delivered, destinations, U.S.A.	46.00¢
	Foreign Chilean Copper, Valley basis	46.00¢
LEAD:	Common Grade, New York	16.00¢
	Tri-State Concentrates, jig, flotation 80% lead, per ton	\$201.32
ZINC:	Prime Western: F.o.b. E. St. Louis	13.50¢
	Prime Western: Delivered, New York	14.00¢
	Tri-State Concentrate, 60% zinc, per ton	\$84.00
	Primary 30 Pound Ingots (99% plus). F.o.b. shipping points	25.90¢
ALUMINUM:	Lone Star Brand. F.o.b. Laredo, in bulk	33.50¢
ANTIMONY:	(In ton lots) price per pound	\$2.25
BISMUTH:	97-99% kag of 550 pounds (Price per pound)	\$1.70
CADMIUM:	Powder	\$2.40
COBALT:	Nom., per pound	\$119.25
COLUMBIUM:	98% (per pound)	\$11.00-\$14.00
LITHIUM:	Ingots (99.8%) F.o.b. Valasco, Texas, per pound	34.50¢
MAGNESIUM:	Flasks. Small lots, New York	\$261.00-\$263.00
MERCURY:	"P" Ingots (5 pounds). F.o.b. refinery, Port Calbourne, Ontario	64.50¢
NICKEL:	99.5% per pound	\$13.50-\$15.50
SELENIUM:	per kilogram	\$43.00
THORIUM:	Grade A. Brands, New York (Price per pound) Prompt delivery	94.125¢
TIN:	99.3% + Grade "A" Sponge (Price per pound)	\$3.25
TITANIUM:	Nominal, per kilogram	\$40.00
URANIUM:	Nominal, per kilogram	\$11,000.00
U-235:	United States Treasury Price	\$35.00 per ounce
GOLD:	Newly mined domestic. United States Treasury price	90.50¢ per ounce
SILVER:	Foreign Handy Harmon	\$103.00-\$105.00
PLATINUM:	Sponge, Per Pound, Nominal	\$10.00
ZIRCONIUM:		

ORES AND CONCENTRATES

BERYLLIUM ORE:	10 to 12% BeO. F.o.b. mine, Colorado	\$47.00 per unit
	Small lot purchases at Custer, S. D., Spruce Pine, N. C., and Franklin, N. H.	
	Visual inspection at \$400.00 per short ton or by assaying at: 8.0 to 8.9% BeO, \$40 per unit; 9.0 to 9.9%, \$45; over 10.0%, \$50.	
CHROME ORE:	F.o.b. railroad coasted cars, Long tons dry weight.	
	African (Rhodesian). 48% Cr ₂ O ₃ . 3 to 1 Ratio	\$45.00-\$46.00
	African (Transvaal). 48% Cr ₂ O ₃ . No Ratio	\$31.00-\$32.00
	Turkish, 48% Cr ₂ O ₃ . 3 to 1 chrome-iron ratio	\$53.00
	U. S. Government ore purchase depot Grants Pass, Oregon. Base price, lumpy ore, \$115.00; fines and concentrates \$110.00 for 48% Cr ₂ O ₃ and a 3 to 1 chromium-iron ratio. Premiums for higher grade ore and for a ratio up to 3.5 to 1. Penalties for grades down to 42% Cr ₂ O ₃ .	
COLUMBIUM-TANTALUM ORE:	At United States small lot berry purchase depots, \$3.40 per pound contained combined pentoxides in 50% ore. Includes 100% bonus. (Government stopped buying temporarily May 12)	
IRON ORE:	Lake Superior. Per gross ton Lower Lake Ports	
	Mesabi, Non Bessemer, 51.5% Fe.	\$10.85
	Mesabi, Bessemer, 51.5% Fe.	\$11.00
	Old Range Non Bessemer.	\$11.10
	Old Range Bessemer.	\$11.25
MANGANESE ORE:	Swedish, Atlantic Ports, 60 to 68% Fe. Contracts, Per Unit	22.00¢
	Metallurgical grade, 48 to 50% Mn. Long ton unit	\$1.30
	Metallurgical grade, 46 to 48% Mn. Long ton unit	\$1.27
	Metallurgical grade, 45 to 46% Mn. Long ton unit	\$0.95
	Chemical grade, 80% MnO ₂ . Per Ton	\$70.00
	Domestic U. S. Government ore purchasing depots: Butte, Montana; (black and pink ore) base price of \$4.87 per long dry ton of 18% manganese ore. Phillipsburg, Montana; base price of \$6.43 per long ton unit of 15% manganese ore. Small lot program f.o.b. railroad cars, minimum 40% Mn. Base price (48%) \$2.30 per unit with premiums and penalties.	
MOLYBDENUM CONCENTRATE:	90% MoS ₅ F.o.b. Climax, Colorado. Per pound of contained molybdenum, plus cost of containers	\$1.10
TUNGSTEN CONCENTRATE:	Domestic, 60% WO ₃ Per short ton unit	\$63.00
	Foreign, 65% WO ₃ Per short ton unit (Scheelite)	\$34.00
	Foreign, South American, Spanish, Portuguese	\$33.00
URANIUM ORE:	Carnotite-Rosecolite. F.o.b. purchase depot plus \$0.06 per ton mile (\$6.00 maximum), Grand Junction, Rifle, Durango, Naturita and Uravan, Colorado Salt Lake City, Marysvale, Thompsons, Moab, White Canyon, Green River, and Monticello, Utah. Shiprock, and Bluewater, New Mexico, Edgemont, S. Dakota, Riverton, Wyoming, Tuba City, and Custer, Arizona. Base price for 0.10% ore is \$1.50 per pound and up to \$3.25 per pound of contained U ₃ O ₈ plus \$0.75 per pound for each pound in excess of 4 pounds per short dry ton and an extra allowance of \$0.25 per pound for each in excess of 10 pounds. A \$0.50 per pound development allowance paid on all ore purchases. Special lime schedule applies at Monticello and Moab. No lime penalty with no vanadium payment or lime penalty with vanadium payment.	
VANADIUM ORE:	Carnotite-Rosecolite. V ₂ O ₅ in ratio of more than 10 parts to 1 part of U ₃ O ₈ are generally acceptable at all AEC depots, but excess not paid for at Marysvale, Monticello, and Bluewater. Shiprock has no limit on V ₂ O ₅ to U ₃ O ₈ ratio and all contained V ₂ O ₅ is paid for	Per Pound V ₂ O ₅ \$0.31

NON-METALLIC MINERALS

BENTONITE:	Minus-200-mesh. F.o.b. Wyoming points. Per ton in carload lots	\$12.50
	Oil Well grade. Packed in 100 pound paper bags	\$14.00
FLUORSPAR:	Metallurgical grade, 70% effective CaF ₂ content per short ton F.o.b.	
	Illinois-Kentucky mines	\$32.00-\$35.00
	Mexican, 70% f.o.b. border	\$24.00-\$24.50
	European, Atlantic Ports, 70%	\$33.00-\$34.00
	Acid Grade, 97% CaF ₂ F.o.b. Kentucky, Illinois, Colorado	\$47.50-\$50.00
PERLITE:	Grade: F.o.b. mine per short ton	\$3.00 to \$5.00
SULPHUR:	Plaster grades. Crushed and sized, F.o.b. plants	\$7.00 to \$9.00
	Long ton, F.o.b. Hoskins Mound, Texas	\$25.50
	Export	\$30.50

LONDON METAL AND MINERAL PRICES

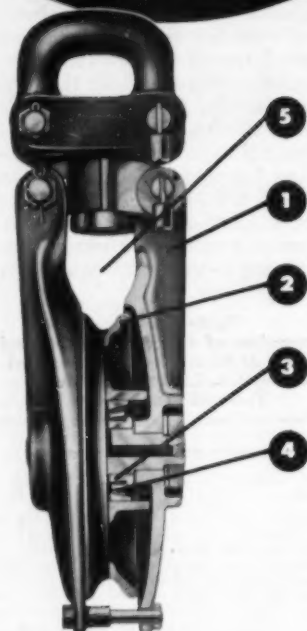
		June 15, 1956	Per Long Ton USA Equivalent cents
COPPER:	Electrolytic spot	£301	0s 0d 37.62¢
LEAD:	Refined 99%	£112	0s 0d 14.00¢
ZINC:	Virgin, 99.5%	£95	0s 0d 11.87¢
ALUMINUM:	Ingots, 99.5%	£189	0s 0d 23.625¢
ANTIMONY:	Regulus, 99.6%	£210	0s 0d 26.25¢
TIN:	Standard, 99.75%	£736	0s 0d 92.00¢
TUNGSTEN:	Long ton unit, 269 S		\$36.40 per long ton unit

1. With Sterling pound at \$2.80.

Quotations on metals and certain ores through the courtesy of American Metal Market, New York, N. Y.

Pacific SHEAVE BLOCKS

give you
MORE
for your money



OUTSTANDING FEATURES:

1. The only Sheave Blocks with manganese steel sheaves and side frames for toughness, shock resistance and long life.
2. Sheave rims are recessed into side frames to prevent rope fouling.
3. Efficient grease seals retain lubricant and exclude foreign material.
4. Tapered roller bearings are load-rated with extra-high safety factor.
5. Wide throat passes square knots.

Available in Half Side Plate and Full Side Plate Models in 8", 10" and 12" sizes with hook, shackle or safety swivel shackle. Send for name of nearest representative and for Bulletin No. 238 covering complete line.

OTHER PACIFIC PRODUCTS: Jaw Crushers, "Slushmaster" Scrapers, "Round-The-Corner" Sheave Blocks, Bit Knockers and a wide variety of Pacific Wearing Parts.

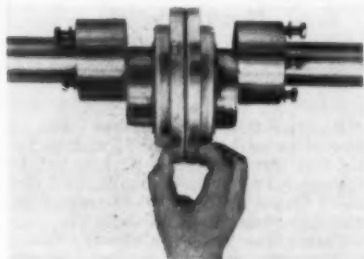


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PRODUCTION EQUIPMENT PREVIEW

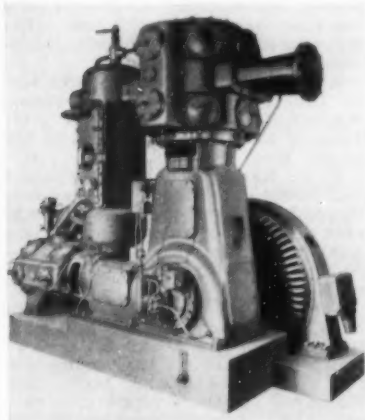
PEP is just what new equipment, increased mechanization, and new methods can give to your mine, mill or smelter. This PEP section is MINING WORLD's way of making available to you some of the finest current information on mechanization.



Falk Presents New Spacer Type Shaft Coupling

The Falk Corporation has recently put on the market a newly designed spacer-type flexible shaft coupling which is ideally suited for quick connections and disconnection of shafts on installations that require more than a normal gap between connected shafts.

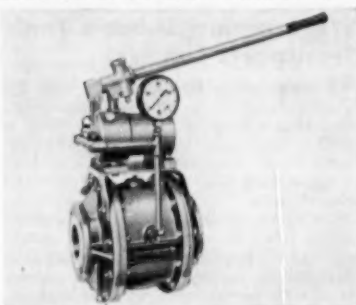
Named the Type F Steelflex Spacer Coupling, it is ideal for use between motors and pumps (where a gap between shafts must be provided to permit removal of pump impeller shaft assemblies) or on any application where a large gap (up to 12-inches) cannot be avoided. Over and above the protection which is offered by Steelflex against damage from impact loads and shaft misalignment, the coupling affords easy connection and disconnection of shafts (see photo) without disassembling the coupling. Circle No. 59 for further information.



Large Size Compressors Now Available From Copco

Atlas Copco Pacific Inc., has recently announced broadening of its line to include the full range of Atlas Copco series AR compressors. Previously, this supplier of Swedish-made mining equipment focused its activities on smaller and portable compressors.

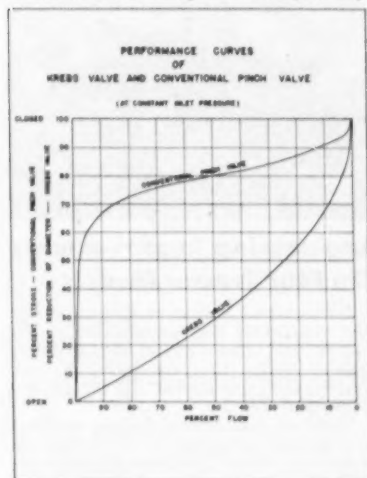
The heavy-duty AR series is said to be especially designed for permanent mining operations. It includes six models, ranging in size from 330 to 3,220 cfm, with L-shaped engines, of the two-stage, double acting type, which are fully counter-balanced. Relatively low operating speeds are claimed to be the stand-out feature of Atlas Copco models. Longer valve life and less operating heat are among the reported accrual advantages; as well as a power requirement to drive, said to be about 5 percent less than that of comparable size compressors. Standard type synchronous or induction motors may be used as the drive source. Circle No. 80 for further information.



Advancement In Slurry Valves Made By Krebs

An advanced development in rubber slurry valves is announced by Equipment Engineers Inc. Stressing better control for abrasive and corrosive flows, the Krebs Rubber Slurry Valves are encased and rupture-proof, have maximum, abrasion resistance, simple remote finger-tip control, and center orifice flow.

According to the manufacturer, a center orifice, with a venturi flow pattern results in the lowest pressure drop of any

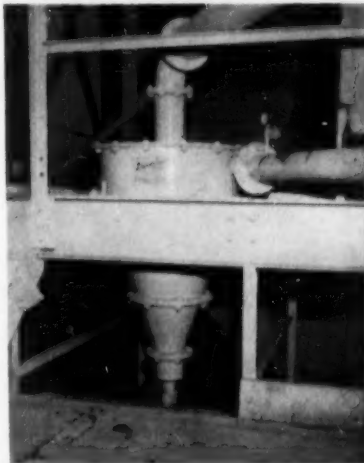


valve. Low friction through a streamlined, round hole and cushioned action of a thick rubber wall provides maximum abrasion resistance, resulting in negligible wear. Note close control of fluids available with Krebs' Valves as compared to ordinary pinch valves on curves shown. For further information and brochure circle No. 67.

New Overseas "Cat" Plant Set for Glasgow, Scotland

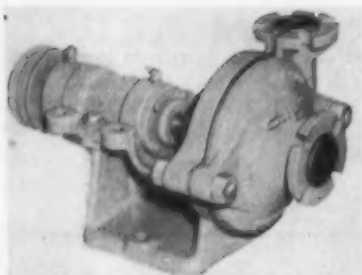
A half-million-square-foot plant will be built at Glasgow, Scotland, by the Caterpillar Tractor Company, Ltd. of Great Britain. Production of Cat D8 and D4 tractors, exact counterparts of American models, is expected to begin by 1958.

Development of the Scottish manufacturing project will be under the direction of James R. Munro, director of manufacturing, foreign operations. Managing director of Caterpillar Tractor Company, Ltd. is W. J. Bornholdt.



New Cyclone Introduced To The Mining Industry

The H. B. Large Co. has recently introduced to the mining industry a new type cyclone unit. Called the Duraclone, the rubberlined unit is available in variety of diameter sizes ranging from six to 50 inches. Feed and overflow pipe sizes vary from 1, and 1½ inches, to 8 and 10 inches respectively. Feed pressure to the unit is approximately 18 psi. As compared to similar units, the cost of the Duraclone is relatively low, and has given an excellent account of itself in the sand and gravel industry, and several mining installations. Excellent classification and resistance to wear are just a few of the noteworthy features of this completely guaranteed unit. Circle No. 79 for further information.



Rubber-Lined Pumps by Warman Available Here

Carpco Manufacturing, Inc. of Jacksonville, Florida recently announced that it has obtained the manufacturing and sales rights for the Warman Pump in the U. S. The Warman Pump was developed in Australia and is widely used throughout the Far East.

It has been designed for heavy continuous duty handling of abrasive slurries or corrosive liquids without sealing water. The centrifugal sealing device will withstand a positive intake head of approximately 10 to 15 percent of the delivery head developed by the pump for any given duty without leakage.

The popular 1 by 3/4-inch model pump is now in production and all sizes of the Warman Pump up to 8 by 10 inches will soon be available from Carpc. For further information and prices, circle No. 78.



15,000-Lb. Fork Truck Introduced by Clark

A new 15,000 pound capacity, dual wheel drive, pneumatic-tired fork truck designed for lumber and heavy outside work has been introduced by the Industrial Truck Division of Clark Equipment Company.

Named the YL-150, the machine has a full-load road speed of 20 mph, 30% gradeability, and a lift speed of 50 feet per minute. The truck features a Hercules



JXC gas engine of 282 cubic inch displacement, a design which puts at least 50% of the machine's weight on the front axle, and 9 inches underclearance beneath the uprights. "Uniformly controlled" high speed power steering is standard on the YL-150. An improvement over conventional power steering, this feature gives uniform steering characteristics regardless of speed.

An outside turning radius of 160 inches and a swing length of 189 inches allows the unit to work in cramped spaces. Circle No. 65 for the full story.



Watermelon-Shaped Tank Transports Liquids

A watermelon-shaped rubber tank has been developed by the Aviation Products Division of the Goodyear Tire & Rubber Company that is radically different from conventional methods of bulk transportation and storage of fuels and other liquids.

Called the Rolli-Tanker, the container can be rolled over ground, floated in water, and dropped without bursting. It is expected to meet the need of anyone faced with liquid handling problems.

Rolli-Tankers are unconventionally-shaped tires of nylon cord and tread stock construction with fuel-proof lining. They can be built in a range of sizes. To date the company has tested 3 1/2- by 5-foot tanks that weigh 40 pounds deflated and give the appearance of oversized watermelons when loaded to 250-gallon capacity. Circle No. 61 for additional information.



Engineering Improvements On Four Tractor Models

International Harvester Company has just announced the introduction of its newest and most advanced-engineered crawler tractor line, comprised of four models, the International TD-18, TD-14, TD-9, and TD-6.

Principal engineering changes in these new models, according to the company's Industrial Power Division, are substantially increased horsepower ratings in the

TD-6, TD-9, and TD-14; modern streamlined "new look"; better operator visibility; cerametallic clutch facings; pressurized covering systems; 500-hour track roller seals, and all-weather, positive, easy-starting conversion systems. Circle No. 56 for further information.

Notes From The Manufacturers

Gardner-Denver Company has a new office and warehouse building for its Los Angeles branch. Located in the central manufacturing district, the new address is 7654 East Slauson Avenue, Los Angeles 22, California.

Caterpillar Tractor Company has a new parts department in Denver, Colorado to supply Caterpillar dealers in the Rocky Mountain and Pacific Coast region with their normal parts inventory requirements.

Richard E. Whinrey, general manager of Link-Belt Company's Eward Plant in Indianapolis, has been elected a vice president of the company.

Edward N. Bonnett will head the new Pittsburgh sales office of Roots-Connersville Blower, a division of Dresser Industries, Inc., Connersville, Indiana. The new office is at the Grant Building, Room 2411, Pittsburgh 19, Pennsylvania.

Edward J. Oosthuizen has joined South African Cyanamid (Pty.) Ltd. as a sales engineer in the mineral dressing department. SACPL is a subsidiary of American Cyanamid Company.

David Brown, Inc., distributor of Radicon speed reducers and other gearing made by David Brown Ltd., Huddersfield, England, has moved to new headquarters at 999 Beecher Street, San Leandro, California. The company has also established a Los Angeles office at 6025 Atlantic Boulevard, Maywood, California.

Shelly Hughes is the new president of Differential Steel Car Company, Findlay, Ohio. He succeeds H. Fort Flowers who is now chairman of the board.

F. O. Manol and Irving Rapaport will receive all company business correspondence at the new and permanent headquarters of Four Corners Exploration Company at 205 Petroleum Building, Grand Junction, Colorado.

Raymond L. Schwartz of Twin Falls, Idaho, has purchased some assets of Cummins Diesel Sales Corporation in Boise and has organized a new company, Cummins Idaho, Inc. Plans call for the erection of a new sales and service headquarters in Boise soon. Temporarily, the new Cummins distributorship will operate at 1204 Front Street, Boise.

L. J. Dusenbury has been named head of the Proposal and Contract Department of Western Precipitation Corporation. In his new duties he will be responsible for all estimating, pricing, proposals, and contract administration for Cottrell Precipitators, Multiclone Collectors, CMP Units, and Dualaire Filters.

TRUCK OPERATORS HANDBOOK: A 64-page illustrated handbook on highway and off-the-road tires has been published by B. F. Goodrich Tire and Equipment Company. The handbook includes a tire selection chart and load and inflation tables for tires in all phases of industry. Circle No. 1 for your copy.

A NEW FRONT-END LOADER called the Scoopmobile is now available from Mixermobile Manufacturer's Inc. The one-cubic yard loader, with a capacity of 5,000 pounds, features four-wheel steering for better maneuverability. Two-wheel oscillation permits one wheel to drop into a hole in rough terrain without loss of tractive power to that wheel. Circle No. 2 for further information.

A FOUNDATION material for building up carbon steel parts preliminary to hard-facing is now available in a low-cost build-up electrode. The new electrode sells for under \$0.50 per pound in 100-pound lots. According to the manufacturer, All-State Welding Alloys, the electrode is alloyed to resist plastic deformation. Circle No. 3 for further information.

AN IMPROVED VERSION of Goodyear Tire & Rubber Company's self-charging, electrostatic air cleaner for heating, ventilating and air conditioning systems has been placed on the market by the Akron firm. Circle No. 4 for further information on this new air cleaner, called heavy-duty Pilotron.

INDUSTRIAL RUBBER products by the Boston Woven Hose & Rubber Company are featured in a new 12-page color catalog. The catalog describes all types of hose, belting, and V-belts. Circle No. 5 for copy of this informative brochure.

NEW TURBOPOWER ENGINES: The Detroit Diesel Engine Division of General Motors has announced three Turbopower engines as additions to its Series 71 line of industrial two-cycle Diesels. Presently available are four- and six-cylinder fan-to-flywheel engines and a six-cylinder base-mounted power take-off unit. Circle No. 6 for further information.

SERVICE MANUAL: A complete 45-page, pocket-size service manual is available from the C&D Battery Company. The booklet features complete information on the construction, care, assembly, and disassembly of C&D wet cell bat-

teries. Circle No. 7 for your copy of this useful bulletin.

FLAT ROPE: An extra high strength grade of Flattened Strand Wire Rope has been announced by the Leschen Wire Rope Division, H. K. Porter Company, Inc. The new grade is 15 percent stronger than previously offered. The brand will be called Porter Imperial Red-Strand Wire Rope, and will be fabricated with steel cores. Circle No. 8 for further information.

A NEW BUCKET spill plate attachment for No. 977, No. 955, and No. 933 Traxcavators has been announced by Caterpillar Tractor Co. Designed to make full use of the machines' power and bucket action, the new attachment makes it possible to get heaped loads without excessive spillage even when working in loose material. The attachment is bolted on to the top edge of the bucket. Circle No. 9 for further information.

DRAGSCRAPER CATALOG: Sauerman Bros.' new Catalog gives full details and specifications on Dragscraper machines. The brochure covers standard installations from 1/2- to 5-cubic yards. Several pages of action photographs, and typical layouts of items specified are included. Circle No. 10 for your copy.

H₂S DETECTOR: Development of an improved type hand-operated detecting instrument for hydrogen sulphide, one of the most toxic of the more common industrial gases, has recently been announced by the Mine Safety Appliance Company, Pittsburgh. Principal feature of the new instrument is a dual scale to provide accurate readings in percentages by volume or in grains per hundred cubic feet. Circle No. 11 for descriptive brochure.

INVESTIGATE THE NEW Hough Model HO Payloader. The biggest Payloader yet; it features complete powershift transmission, and planetary final drives to retard wheel slippage. According to the manufacturer the Model HO is more maneuverable, faster, easier operating, easier riding. Circle No. 12 for further information.

DRYING PROBLEMS? If you are contemplating the purchase of a drying unit, or have existing drying problems, then perhaps the new 12-page illustrated bulletin recently released by the Standard

Steel Corporation will help. The booklet describes the Standard-Hersey rotary dryer available in more than 30 different types. Circle No. 13 for your copy.

PLENTY TOUGH is an excellent description of the new H. K. Porter Co., Inc. Quaker Rubber Division conveyor belt. The toughness is derived from a cover tensile strength of 2500 to 3000 average psi, friction pull of 16 to 19 pounds, and multiple-ply carcass of highest quality duck between plies. For further information on this tough conveyor belt circle No. 14.

BUTYL INSULATED CABLE: With the trend towards higher voltages in the mine, many companies are finding they can bring costs down by using overhead Anaconda butyl-insulated cable. According to the manufacturer latest tests show that the AB butyl high-voltage insulation absorbs far less moisture than industry standards permit. Anaconda's AB cable high tensile strength gives you a stronger, sturdier cable. Circle No. 15 for further information.

A FREE BULLETIN is available to you from the Nordberg Manufacturing Company. The recently released bulletin describes the latest line of Nordberg mine hoists. Both conventional and friction type hoists are featured in the booklet. Circle No. 16 for your copy.

SURPLUS TELEPHONES: Save time and steps with your own direct-line inter-telephone system. All types, new and reconditioned, are available. Telephone wire on steel reels, up to one mile in length are available. Circle No. 17 for free brochure published by Loris Sales.

MOBILE DRILLS by Longyear cut time and distance between jobs. Besides their mobility and excellent drill performance, they are designed for quick erection and setting up. Drills may be Jeep, truck, or trailer mounted. Circle No. 18 for free descriptive brochure.

THE RIGHT CLASSIFIER for you may be found in the many classifier options Wemco offers you, regardless of plant size or circuit. Wemco spiral classifiers are available in a variety of pitch angles, spiral lengths, pool depths, and speeds. Send for descriptive bulletin by circling No. 19.

THE KEY TO BETTER drilling for you may be through the use of a Hi-Vac

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drilling system. Vacuum drilling with the products of the Houston Tool Company may be adapted to geophysical, shot hole, blast hole and other types of drilling. For the full story circle No. 20.

GOING PROSPECTING? The Radiac Company of New York can supply you with Geiger and Scintillation counters for every prospecting application, whether it is done by air, vehicle, on foot, or in drill holes. Circle No. 21 for free catalog.

DRIVE THE SCHRAMM Rotadrill on Pneumatractor (a complete self-contained rotary air drilling rig) right to your claim and set up for straight or angular drilling in minutes. Drills a 4½-inch hole at 10,000 pounds down-pressure to 500 feet—with instant and continuous pressure all the way. Circle No. 22 for descriptive bulletin on this unit.

DRILL TO DESTRUCTION with the new Liddicoat Tee Cee Bit. Manufactured with a new line of tungsten carbide inserts, the bit drills to destruction without developing a reverse taper dullness. Investigate this economical method of drilling further, circle No. 23.

WOOD PIPE, and wooden tanks still find a multitude of uses in the mining industry. This economical means of storage and transport for liquids may find a place in your operation. National Tank and Pipe Company specializes in these products. Circle No. 24 for further information.

PUMPS FOR MINE AND MILL: Barrett, Haentjens & Co. of Hazelton, Pa. offer a new bulletin listing its line of pumps for the mining industry. Included in the bulletin are mine and general purpose pumps, vertical mine and solids handling pumps, horizontal solids handling pumps, and automatic pumping arrangements. Circle No. 25.

SPEED-UP DD OPERATIONS: The new Model TS Acker Screw Feed Diamond Drill is ready for action anywhere a Jeep can go. Entirely self-contained with power take-off directly from the Jeep, you save setting-up and dismantling time by being ready to drill the minute you arrive. The unit will drill a maximum depth of 500 feet with E-size tools. Descriptive literature is available. Circle No. 26.

FLOCCULATION AT ANY pH: American Cyanamid Co. now has three Aero-floc Reagents available to give improved

settling and filtration by powerful flocculation at any pH. They are effective at very low concentrations—0.1 to 5 ppm., or 0.01 to 0.1 lbs. per ton of dry solids. A minimum of labor is required for mixing and feeding as they are water soluble with simple agitation. For further information, circle No. 27.

EFFICIENT CLASSIFICATION: The Conceno CPC Classifier produces simultaneously and continuously one to ten or more accurately classified spigot products, and a slime overflow. No moving parts, water is easily regulated, sizing is sharp and maintenance low. For the full story circle No. 31.

METALLURGISTS will be interested in a new 42-page book dealing with the uses and properties of soda ash. Available to U. S. residents only from the Westvaco Chlor-Alkali Division of Food Machinery and Chemical Corp., the book includes chapters on chemical and physical properties, a technical data section, useful information, handling and storage of soda ash, and precautions in bulk handling. You will want a copy of this informative book, so circle No. 77.

DRILLMASTER BULLETIN: Ingersoll-Rand Company is offering at 32 page bulletin on their new Drillmaster 6½-inch blast hole drill. The bulletin covers three types of mountings: crawler, truck, and tractor, and fully explains the revolutionary new "down the hole" drill. Circle No. 42 for your copy.

NEW CONVEYOR IDLER: The new Series 50, ball bearing belt conveyor idler, which offers economic advantages in both original investment and operating power requirements, has been announced by Link-Belt Company. Circle No. 43 for further information.

MECHANICAL GOLD PAN: Available from Denver Equipment Company is a Mechanical Gold Pan, a small placer machine operated with a 1½-hp gasoline engine which imparts an oscillatory motion similar to hand panning. Circle No. 44 for additional information.

MOTOR GRADER HEATERS: New high-output hot-water heaters have just been announced by Caterpillar Tractor Co. as attachments for No. 12, No. 112, and No. 212 Motor Graders. Heater is equipped with two blower fans with an output of 620 cfm. Circle No. 45 for further information.

URANIUM MAP: The Minerals Map Company have recently completed a complete uranium map of the Colorado Plateau. The map shows all surveyed lands on the Plateau, roads, towns, rivers, geology, and present locations of uranium. Price \$3.50. Circle No. 46 for further information.

MAGNETIC DISC BRAKE: Stearns Magnetic, Inc., recently announced the introduction of a new through-shaft magnetic brake incorporating the advantages of solenoid operation. The unit is designed so that the motor shaft extends through the center and out beyond the end of the brake permitting drives off both ends of the shaft. Circle No. 48 for the full story.

SCREEN BULLETIN: Allis-Chalmers vibrating screen (Model S), in sizes up to 4 by 10-ft., one, two or three deck, for handling specification aggregates up to four inches, is described in a new bulletin released by the company. Circle No. 49 for your copy.

VARIABLE SPEED DRIVE: A 44-page booklet carrying handy multi-color tables for quick and easy selection of variable speed "Texrope" drives has been released by the Allis-Chalmers Manufacturing Company. The brochure also contains information on design features, drive principles, horsepower ratings, and many other useful items. Circle No. 50 for your copy.

DUST TIGHT ENCLOSURES for vibrating screens are covered in a new booklet issued by Allis-Chalmers. A hinged cover on the enclosure provides easy access to the screen itself. Circle No. 51 for your copy of this informative brochure.

WIRE ROPE Recommendations is the title of a new brochure issued by the Hazard Wire Rope Division, American Chain & Cable Company, Inc. The bulletin covers more than 120 different types of wire rope used in a multitude of applications. Charts, drawings, and photographs accompany the descriptions. Circle No. 52 for your copy.

ELECTRIC TOOL CATALOG: A new universal electric tool catalog has recently been published by Thor Power Tool Company. Thor's complete line of Silver Line and Speed Tool electric tools is illustrated and described in this publication. Circle No. 53 for your copy.

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Ownership of Borax Mine To Be Transferred to US

A new United States company will be formed to take over ownership of the borax mining and processing facilities of Pacific Coast Borax Company at Boron, California and Wilmington, California from Borax Consolidated Ltd. of London, England. Plans are also underway to merge Pacific Coast Borax and United States Potash Company which is one of the major potash producers in the Carlsbad, New Mexico area.

Incorporation of Pacific Coast Borax holdings in an American firm will permit the British company to take full advantage of depletion allowances before calculating United States taxes. The British firm does not now enjoy this advantage. Pacific Coast Borax will also be in a better position to draw on governmental and private research services available in the United States.

The new corporate structure would also enable Pacific Coast Borax to more easily finance the major expansion program now underway at Boron, California where Isbell Construction Company is stripping 10,000,000 tons of overburden in preparation for open-pit mining. In conjunction with the expansion program Fred J. Twaits Company and Southwestern Engineering Company are constructing a new processing plant in the Boron area to handle production from the open pit mine which is expected to be in operation in the latter half of 1957. Borax Consolidated of England will maintain a controlling interest in the new American corporation.

ARIZONA

The Big Bear Mining Company, Inc. has acquired under lease the Highland mine of the Hope Mining and Milling Company, a group of 32 claims located in the Turquoise district of Cochise County, Arizona. Current work is largely confined to dewatering the 350-foot Highland shaft. A hoist house has been built and a hoist installed, a site prepared for leaching operations, a number of leaching vats constructed, and several tons of cans stocked for use in the leaching operations. Electricity is furnished by the REA. President of the Big Bear company, a Colorado corporation, is Otis Sholes of Elfrida, Arizona. Odell Still, also of Elfrida, is mine superintendent. Until recently, Odell and John Still were leasing and mining at another shaft on the property, but those activities have been abandoned now that work has started at the Highland shaft.

An agreement has been made between the Anaconda Company and Inspiration Consolidated Copper Company whereby Inspiration will participate to the extent of a 40 percent interest in the exploration of a group of claims near Superior, Arizona. The properties involved are those of Belmont Copper Company, Queen Creek Copper Company, Grand Pacific, and Magma Superior Copper Company. They were acquired by Anaconda last January (see MINING WORLD, February 1956, page 104) under purchase

agreements which, if exercised, call for total payments in excess of \$1,250,000.

Metallurgical recovery of the non-sulphide content of the low-grade ore body at Miami Copper Company, Miami, Arizona, has not met expectations, reported R. W. Hughes, vice-president and general manager. As a result, mining schedules have been revised, he said, to eliminate 3,500,000 tons of high non-sulphide material from mining reserves. It is believed that extraction of the copper values remaining in the unmined reserves can best be accomplished by in-place leaching at the conclusion of mining operations, and extensive expansion and modernization of the precipitation facilities are being undertaken for that purpose. Total production from the Miami mine in 1955 was 39,166,321 pounds of copper, with 14 percent of that amount recovered by the acid leaching of previously mined areas. In addition, Miami recovered 425,239 pounds of molybdenum through the retreatment of copper sulphide concentrates. Manager of Miami operations is B. R. Coil; J. H. Gray is general superintendent.

Delivery is currently being made to the Pima Mining Company of Tucson, Arizona on an order for 11 Kenworth rock-and-ore movers which will be used in the open-pit operations near Tucson. Tailored to the rugged operation, the trucks will be worked in connection with a rockover skip system which was fabricated for Pima by the National Iron Company of Duluth, Minnesota.

In 1955 the Copper Cities Mining Company, Miami, Arizona, mined by open-pit methods 4,004,052 tons of ore with a total copper content of 0.824 percent, and recovered 55,097,164 pounds of copper. Stripping of the ore body required the removal of 3,347,720 tons of waste, giving a waste-to-ore ratio of 0.84 to 1.00. Effective January 1, 1956,

Copper Cities Mining Company and Castle Dome Copper Company were merged into Miami Copper Company and since that date have been operated as divisions of the parent company. On January 1, 1956, mineable reserves at Copper Cities were estimated to be 29,500,000 tons. In addition, there is known to exist a considerable tonnage of lower grade material which, under favorable conditions, can be marketed.



Great Lakes Oil & Chemical Company's Uranium Division has resumed operations at the Kergon uranium mine in the Kern River Canyon of California after a recent court decision in its favor. Shipments were interrupted late in 1955 when the mine was closed on the advice of the firm's consultants and attorneys pending the outcome of some \$650,000 in litigation brought against the company by adverse claimants. Purchase contracts with the AEC are being renegotiated.

A 51-ton shipment of copper ore recovered from old dumps at the Calaveras mine, Copperopolis, California has netted \$1,958. Copper content was more than 8 percent. Additional cars are being shipped by Daybreak Uranium, Inc. of Spokane, Washington.

James Slosson, head of the geology department of Los Angeles Valley Junior College, reports that he has discovered large quantities of tungsten in the Mojave Desert near Twentynine Palms, California.



Lewisohn Explores Arizona's Helvetia District

Lewisohn Copper Corporation, which has consolidated several claims and holdings in the Helvetia District 25 miles south of Tucson, Arizona, now has three diamond drill rigs and one churn drill operating on the properties under an exploratory program. Shown above is one of the diamond drills working near the top of an outcrop on the Elgin group of claims. All drilling is done under contract, and at mid-April, 13 diamond drill holes totalling 3,500 feet of drilling had been completed. The district has had a record of sporadic production from small scattered deposits of high-grade copper mineralization. The best ore disclosures to date seem to lie in a chloritic shale lying just below the Naco time formation. The main structure is nearly north-south with nearly vertical to 70° easterly dips. Richard Chilson of Tucson is president and treasurer of Lewisohn Copper.



Kennecott Copper Corporation Nevada Mines Division reports that first ore was produced from its Minnesota-Hi ore body on February 24, and the ultimate output of 4,000 tons per day is expected to be reached in late August. The 1,333,333-ton deposit was found during development of the Deep Ruth project. The ore contains 23.5 pounds of copper to the ton. Because of this discovery production at the Deep Ruth has been delayed until

after the Minnesota-Hi ore has been recovered. (The ore body is above and partly within the expected caving area of the Deep Ruth.) In the Star Painter shaft, a new station and ore pocket were cut at the 820 level, and a total of 4,490 feet of main haulage drifts have been driven.

Samuel S. Arentz has acquired a 60-day option on the gold-copper properties of the Mammoth Mining Company in the Eureka district of Nevada. If Mr. Arentz exercises the option, an initial expenditure of \$100,000 is planned in development work.

Consolidated Coppermines Corporation at Kimberly, Nevada is awarding another \$2,000 scholarship to a graduate student of the White Pine County (Nevada) High

School for the year 1956. The scholarship is awarded yearly in the form of a \$500 grant, and is renewed annually provided the recipient maintains a standard in keeping with the scholarship requirements of the college of his or her choice.

Cities Service Oil Company, Kerr-McGee Oil Industries, Inc., Superior Oil Company, and N. B. Hunt Company of Dallas, Texas, are said to be doing extensive preliminary exploration in the Jemez Mountains northwest of Albuquerque, New Mexico. Cities Service is setting up a field office at Jemez Springs. It has also obtained a uranium exploration lease from the Texas National Petroleum Company on the 110,000-acre Canon de San Diego Grant in Sandoval County.

International Uranium Corporation of Albuquerque, New Mexico has made a carload shipment of copper ore from its mine in the Manzano Mountains, south-east of Albuquerque.

Slatex Venture, a mining firm with offices in Albuquerque, New Mexico, has begun open-cut mining for uranium in Rio Arriba County. Boyd Johnson is general superintendent.

The DMEA has granted loans to the following firms for uranium exploration in McKinley County, New Mexico: Colamer Corporation, \$102,580; Food Machinery & Chemical Corporation, three loans at \$41,740, \$91,908, and \$71,928; Parador Mining Company, Inc., \$45,580; and San Jacinto Petroleum Corporation, \$74,360.

Kennecott Copper Corporation's research laboratory at the Chino Mines Division headquarters in Hurley, New Mexico is currently testing cyclone classifiers in the mill, the lime plant, and the tailings dam. Results of testing in the fine grinding department at the mill indicate that the cyclones may replace the conventional classifiers now in use. They are being tested at the lime plant for removing sand from the milk of lime which is produced for the mill, and results so far are favorable. At the tailings dam, the cyclones are being tested for separating sand from the slime to furnish thickened material for building border around the ponds.

Wright, Clark and Senkel, Inc. of Graham, Texas will do exploration and development work on two uranium claims in the Grants area of New Mexico for United Western Minerals, Inc.

Colamer Corporation, a wholly owned subsidiary of Swan-Finch Oil Corporation, has been granted a \$100,000 DMEA loan to undertake a uranium exploration program in the Poison Canyon area of New Mexico. The government will finance 75 percent of the cost of the project.

The Hawkins, Kelly and Butterworth Mining Company plans to recover copper and zinc by underground mining at a mine 10 miles south of Hatchita, Hidalgo County, New Mexico.

Catacart Uranium Mining Exploration Corporation of New York, which recently

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acquired 1,000 acres in the Ambrosia Lake area of New Mexico has announced also the pending acquisition of assets of *Oasis Uranium Oil Corporation* of Oklahoma City, Oklahoma and Fort Worth, Texas.

A copper strike has been reported 15 miles north and west of Carlsbad, New Mexico. Lease on the property is said to be held by Jack T. Kimbrough of Carlsbad and John Pirtle of Colorado. They have stockpiled 150 tons at the open-pit operation, and have made some shipments to the *American Smelting and Refining Company's* smelter at El Paso, Texas, according to reports. The mine had been worked in the past on a small scale and without significant profits. Plans are reportedly being made for a dry-separation-process mill on the property. Other claims in the area are in the names of J. E. Wilson, William Lee Clary, Everett Grantham, H. L. Marshall, Jim McCall, John Lorinsky, and William C. West.

Utah Drilling Company has commenced core drilling on Mount Peale Uranium Company's property in the Ambrosia Lake uranium district of New Mexico. The Mount Peale property is bounded by *Sabre Uranium, Northeast Uranium, Pinon*, and *Kerr-McGee* properties.

New Mexico State Mine Inspector John Garcia predicts that in the next year or so strip and open pit mining of uranium ore in the Grants area will largely give way to shaft mining. *Rio D'Oro-Midcontinent Exploration Company* has completed a shaft to a depth of 400 feet in the area, and work is being done on a shaft at *Haystack Development Company's* (Santa Fe RR) *Poison Canyon* mine, one of the more prolific sandstone mines in the Grants area.



Among the companies active in uranium exploration in the Gulf Coastal Plain area of Texas are: *Climax Molybdenum Company, Federal Uranium Company, Continental Oil Company, American Metals Company, Southern Minerals, Spartan Oil, Superior Oil, The Texas Company, and South Texas Oil and Gas.*

Texas Gulf Sulphur Company is expanding its facilities for production at new deposits in Texas and Mexico. A plant will be built near Fannett, Jefferson County, Texas; while \$3,500,000 will be spent on a plant to use the Frasch method at a site in Tehauntepec, Mexico, which is expected to start operations this fall. The firm produced seven percent more sulphur in 1955 than in 1954, while 1955 shipments exceeded 1954 by about nine percent. As in 1954, the company continued its production at the Newgulf, Moss Bluff, and Spindletop Frasch process plants in Texas.

Mammoth Uranium Corporation reports a uranium strike on its property in the Big Bend district of Presidio County, Texas, where it holds 587 acres. Construction work has started on camp buildings, housing facilities, and an air strip preparatory to development work.



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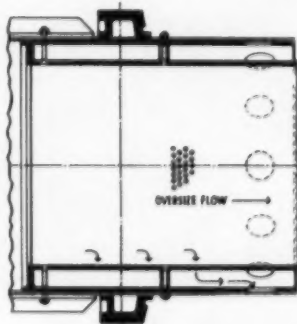
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Extension and Price Rise for Mica Industry

The domestic mica mining industry received a "shot in the arm" with the announcement of two new policies by the government. First, the mica buying program has been extended another five years until June 30, 1962. Second, the prices paid to miners for mica brought to any of the three government purchasing depots have been increased. (The three depots are at Spruce Pine, North Carolina; Custer, South Dakota; and Franklin, New Hampshire.)

The effect of these new policies on the Spruce Pine mica district has been almost instantaneous. A number of mines in the area that have been inactive in recent months are already back at work. Some mines are being reopened; others that have not been in operation for some years are being cleaned out and prepared for steady working. Deposits not previously worked are being explored.

The new prices are reported below: Ruby, full trim, good stained and better, size 3 and larger—\$70 per pound (no change), sizes 4 and 5—\$40 (unchanged), 5% and 6—\$17.70 (up from \$15).

Ruby, stained, 3 and larger—\$31.90 per pound (up from \$18), 4 and 5—\$18.25 (up from \$18), 4 and 5—\$18.25 (up from \$8), 5% and 6—\$7.55 (up from \$5).

Heavy stained, 3 and larger—\$14.80 (up from \$13), 4 and 5—\$6.85 (up from \$6), 5% and 6—\$4 (up from \$3).

Non-ruby, full trimmed, 3 and larger—\$70 (unchanged), 4 and 5—\$40 (unchanged), 5% and 6—\$17.70 (up from \$15).

Non-ruby, stained, 3 and larger—\$25.55 (up from \$14.40), 4 and 5—\$14.60 (up from \$6.40), 5% and 6—\$6.55 (up from \$4). Heavy stained, 3 and larger—\$11.85 (up from \$10.40), 4 and 5—\$5.45 (up from \$4.80), 5% and 6—\$4 (up from \$2.40).

In addition to the price changes, the new regulations also changed the "alternative" provision relating to hand cobbled

mica. Under this provision the miner may elect to deliver finished mica or permit the government to perform the splitting and trimming. Instead of deducting \$1.45 a pound for rifting and trimming, the government will deduct \$4 a pound.

There are no price changes in the ruby half trimmed and non-ruby half trimmed grades.

Expansion Planned For New Jersey Iron Mines

The Warren Foundry and Pipe Corporation is drafting plans to expand iron ore production at its New Jersey mines from 500,000 to 2,000,000 annual tons. Warren operates the Mt. Hope and Wharton underground and open-pit magnetite mines and a 1,500-ton mill. The mining rate is being speeded with plans for 960,000 annual ton rate by the end of 1956. Further expansion will necessitate new shafts and extensive underground development work.

Corporation directors recently changed the firm's name to Shahmoon Industries, Inc. in honor of S. E. Shahmoon, chairman, president, and majority stockholder.

centrating methods used in the district. Other reports will be issued from time to time as examination of the area progresses.

Geologic maps of four quadrangles in the Michigan copper district have been published by the U.S. Geological Survey. The maps show in black and white the bedrock geology of the area between Calumet and Painesdale, in Houghton County. Published in the Mineral Field Investigations Series at a scale of 1:24,000, the maps include the following: MF-43, Geologic Map of Chassell quadrangle; MF-46, Geologic Map of Hancock quadrangle; MF-47, Geologic Map of Laurium quadrangle; and MF-48, Geologic Map of South Range quadrangle. They may be purchased for 50 cents each by mail from the U.S. Geological Survey, Washington 25, D.C.



The Department of the Interior has released the first of a series of U. S. Bureau of Mines reports based on reconnaissance of manganese deposits in the Batesville district of Arkansas. This area has produced about 432,000 tons from the beginning of mining in 1849 through 1953. The report also contains information obtained during earlier drilling projects by the Bureau, and, subsequently, by the Westmoreland Manganese Corporation under a DMEA loan. It also describes the ore and mining and con-

The price of platinum has been increased by \$6 per ounce to \$103 an ounce for wholesale quantities and \$105 for retail lots. The rise reflects a short supply and increased use of the metal by industry. The current price is now more in line with quotations in London and Paris which are around \$107 per ounce.

A greater than seasonal slump in sales of fertilizer and manufacture of phosphoric acid have brought a slowdown in phosphate mining in Florida. *International Minerals and Chemical Corporation* has closed its *Peace Valley* mine between Bartow and Fort Meade. The mine has operated continuously for 14 years without a shutdown, most of the time on three shifts per day. All equipment will be kept in a standby condition. The "Bigger Digger" dragline which weighs over 2,500,000 pounds has been moved to the company's *Noralyne* mine nearby. *American Cyanamid Company* has cut its work week to 40 hours in most of its phosphate mining operations.

U.S. Industrial Chemical Company, division of *National Distillers Products Corporation*, which earlier announced plans for construction of a 1,500,000-pound-per-year, reactor-grade, zirconium sponge plant (see *MINING WORLD*, June 1956, page 75), will also complete a separate 500,000-pound-per-year, semi-commercial, metal plant within the next few months. The smaller plant will be located near the larger one at Ashtabula, Ohio, and will be used for production of zirconium sponge during the construction of the larger one. This smaller plant has been designed for easy conversion to production of titanium or hafnium sponge, and also thorium or beryllium.

Full-scale operations of the new facilities at the Bonnie plant of *International Minerals and Chemical Corporation* near Bartow, Florida is expected to be reached this month, a full six months ahead of schedule. The facilities double the present output of dicalcium phosphate.

The Office of Defense Mobilization has raised the expansion goal for nickel to 440,000,000 pounds annually by 1961. The present goal of 380,000,000 pounds



Empire Mines and Mill in Production

The historic old Empire mines and mill in the Marysville area of Lewis and Clark County, Montana, are in production again. Montana Mining and Milling Company, Inc. has reopened the property and the mines are now working two shifts, with a daily output of over 100 tons of lead-silver-gold ore. The mill has been enlarged to handle 150 tons per day, and tune-up started on June 15. The project is under the direction of D. B. Holskvam and Dr. J. F. Vandenbergh.

CENTRAL AND EASTERN

has never been reached; annual supply is now about 300,000,000 pounds. To encourage production increases, the government will (1) offer contracts to buy the metal at the prevailing market prices, with a minimum price provision included; and (2) authorize rapid tax amortization within a five-year period.

Titanium Metals Corporation of America has reduced the price of titanium sponge metal 20¢ per pound, bringing the price down to \$3.25. This is the fourth price cut initiated by TMCA in a 14-month period, and is part of an aggressive program to make this metal fully competitive with certain steels, aluminum, and magnesium. Titanium Metals Corporation is owned jointly by **Allegheny Ludlum Steel Corporation** and **National Lead Company**.

International Minerals & Chemical Corporation has acquired additional prospecting equipment for its operations in Tennessee.

Brown McKinney has received a \$5,-080 DMEA loan to explore for mica in Mitchell County, North Carolina. The government's share is \$3,810.

Mineral rights to some 750 acres in the spodumene belt near Grover, North Carolina have been leased by the **Sta-Tex Oil Company** of Houston, Texas. Operations are expected to start shortly. The agreement provides for royalties of 50¢ per ton of ore, or 10 percent of the gross sales, whichever is larger, to the owners of the property who are O. M. Mull of Shelby, James C. Bell, James K. Boheler, and George Hambright, all of Kings Mountain.



As of June 6, iron ore shipments on the Great Lakes totaled 19,681,309 tons for this season, as compared with 16,643,502 gross tons at that time last year. All mines and plants on the Mesaba Iron Range are producing at near capacity this season.

Jones & Laughlin Steel Corporation will construct a plant at Calumet, Minnesota to concentrate tailings contained in the **Hill Annex-Arthur** tailing basin. Crude iron-bearing tailing will be mined by hydraulic dredge for combination treatment by froth flotation and Humphreys spirals. Design and construction of the hydraulic dredge will be done by the **American Steel Dredge Company, Inc.** of Fort Wayne, Indiana, while **Western-Knapp Engineering Company** of Hibbing will handle the plant engineering and construction contracts.

M. A. Hanna Company has changed the name of its **Parcel 3** mine near Coleraine, Minnesota to the **Hunner** mine, in honor of Earl E. Hunner who retired from the company on August 16, 1951. Mr. Hunner had spent almost 50 years with the company and was executive consultant at the time of his retirement. Work on the mine was started last year. Surface stripping is on a 15-shift basis, and plant construction is continuing. Planned beneficiation capacity is 500,000 to 1,000,000 tons annually.

The **Richmond** iron ore mine near Palmer, Michigan has been closed permanently by the **M. A. Hanna Company**.

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Newmont-ASARCO Plan Jo Pb-Zn Mining in Leadville

Just over one year ago the American Smelting and Refining Company and Newmont Mining Corporation's wholly owned subsidiary—Resurrection Mining Company started a joint exploration and development program in the Leadville, Lake County, Colorado district.

Success of the program is evident by the recently announced plans for a joint mining and milling program with all exploration terminated for the present. Under the plan ore will be mined primarily from ASARCO's Irene No. 2 shaft through the Yak Tunnel, and from Resurrection's Julia Fisk shaft in Iowa Gulch. With a planned combined mining rate of 400 tons per day, the Resurrection mill at the portal of the Yak Tunnel has been completely rehabilitated for treating a minimum of 400 tons of ore daily.

Work has started on installation of a new hoist at the Irene, together with compressors, change room, and hoist house. At the Julia Fisk, a new surface plant and hoisting equipment have been completed.

ASARCO controls a large acreage in the Ibez-Sunday area where diamond drilling from the Eclipse mine workings several years ago disclosed mill grade base metal ore bodies in a down faulted block of Leadville Blue Limestone. Initial mine development to reach this deep ore horizon was through the 650-foot-deep Irene Winze. Later ASARCO collared and sank its Irene No. 2 shaft 1,000 feet from the surface to connect with the top of the winze. Subsequently the shaft was deepened to the 1,750-foot level.

Resurrection controls and operates the long Yak Tunnel and adjoining mines which border ASARCO's ground on the west and northwest.

Under the joint development program, the Irene No. 2 shaft was connected to the Yak Tunnel. In the Iowa Gulch area, a new 450-foot level was established at the Hellena shaft and driven 1,000 feet westerly to the Julia Fisk shaft. From the level six raises were driven to the ore horizon beneath the porphyry 60 to 70 feet above the level. Extensive underground diamond drilling was also carried on from the level to prospect below and above the level.

COLORADO

Treasure Mountain Inc., a newly formed Nevada mining firm, has completed the consolidation of the Lead Carbonate, Gold King, Pride of Bonita, and Golden Monarch mines in the Eureka mining district of San Juan County, Colorado. A good sized ore body has been developed below the main haulage level in the Lead Carbonate mine. Mining of this block and rehabilitation and enlargement of the mill to 200 tons per day capacity is now in progress. Further development of the mine to an additional depth of 250 feet has started. The Gold King has been partially rehabilitated. It is planned to open up the mill level, or lower level of the mine, connect this level with the upper levels of the Gold King and with the Golden Monarch, Pride of

Bonita, and Lead Carbonate mines, and drift in the Gold King property to the Sunnyside mine which adjoins the Gold King. The Pride of Bonita mine is to be developed by driving the present adit along the Pride of Bonita vein to the intersection of that vein with the Royal Oak vein. Henry P. Ehrlinger of Silverton, Colorado, is the president. A. W. Freeland of Long Beach, California is vice president, and C. F. Parker, Jr., of Grand Junction, Colorado is the secretary of Treasure Mountain, Inc. Offices are in Silverton, Colorado and at the present time 17 men are employed in getting the property into shape for the increased operations.

Climax Molybdenum Company and the Mallinckrodt Chemical Works have agreed to submit a joint proposal to the United States Atomic Energy Commission for the construction and operation of a privately owned plant for the refinement of uranium compounds. If the proposal is accepted, the two firms will form a jointly owned company to construct and operate such facilities. Climax would be majority stockholder.

Fire destroyed the surface plant at the Resurrection No. 2 mine near Leadville, Colorado. Six men escaped underground by walking a mile through the Yak tunnel to another mine entrance. The lead and zinc mine is leased by Robert Jones from the Resurrection Mining Company.

A new milling unit designated as No. 17, and similar to No. 10 now under construction, will be built by Climax Molybdenum Company at the east end of its No. 3 and No. 4 mill buildings at Climax, Colorado. The No. 10 to be completed about August 20 will increase plant tonnage by about 3,800 tons. The No. 17

unit will enter the milling circuit about February 15, 1957, and will increase recovery of molybdenum disulphide concentrate by about three percent with no increase in tonnage. The No. 10 unit will have six flotation machines with a total of 70 cells, while the No. 17 unit will have 70 flotation cells in five banks.

American Leduc Uranium, a subsidiary of Penn Canadian Oil Company, has obtained reassignment of leases it held on 21 claims in the Outlaw Mesa group in Mesa County, Colorado. The company had previously assigned them to Crescent Uranium. Now American Leduc plans to expand operations at the two Peach mines, formerly operated by Crescent; to mine recent or discoveries on the company's main property in the area; and to mine the recently acquired Blue Creek claims.

The Union-Gulf Oil and Mining Corporation of Denver, Colorado is reported to have leased the old Sts. John silver mine near Montezuma, Summit County, and plans immediate development work.

Utaco Uranium, Inc. is revamping its Silver Shield mill at Ouray, Colorado. When ready for production, the company will start shipping ore from the Bradley mine near Telluride which was purchased earlier this year from Mt. Wilson Mining Company.

The International Minerals and Chemical Corporation has entered into an agreement with the Cotter Corporation of Santa Fe, New Mexico which provides that thorium from Cotter property will be processed at International's plant at Parkdale, Colorado. The latter, a 1,000-ton flotation mill, has been closed since 1953. Cotter holds claims in the vicinity



Air Lift Brings Compressor to Drill Site

The use of helicopters in mining is growing every day. Here is an interesting situation where a helicopter provided the easiest solution for a difficult problem. Earlier this year, Atlas Corporation decided to test drill for uranium in the Hidden Splendor Mine area of Utah. They wanted to drill down from the top of a 1,500-foot cliff which is part of the massive Wingate formation, through the Chinle and Delta formations, to the Moenkopi shales and mudstones. It was desired to have the holes cut the Delta formation where the ore was supposed to be and to have the holes bottom in the Moenkopi. The holes were to be around 800 feet deep. The company was faced with the problem of placing an air compressor on top of the sheer 1,500-foot canyon wall. It was decided that a helicopter could do the job. A LeRoi 105 cfm portable air compressor was selected, dismantled, flown to the top piece by piece, and then reassembled. The compressor operated in temperatures as low as 20° below zero and at an elevation of over 7,000 feet. A complete camp was set up on the top of the cliff, because of the expense involved in flying up and down. It took a man a full day to scale the cliff, as compared with five minutes of flying time by helicopter.

ROCKY MOUNTAIN

of Canon City, Colorado. Actual re-opening of the Parkdale plant will depend upon the amount of ore available for treatment; in the meantime, International is undertaking the pilot plant work.



Utah-Idaho Consolidated Uranium, Inc. of Kellogg, Idaho is starting ore shipments from the Moki claims in the Elk Ridge District, San Juan County, Utah. **Ridge Ledge Uranium** has a 50 percent interest. Utah-Idaho is successor firm to **U. & I. Uranium**, which last year was merged into **Federal Uranium Corporation** after drilling out the Radon ore body in the Big Indian District. **Lester S. Harrison** is president. **Frank Taft** is in charge of the operation.

San Francisco Chemical Company has started engineering and development of 3,000 acres of phosphate reserves 14 miles northeast of Vernal, Utah which it has taken under option from **Humphreys Phosphate Company**. Resident engineer of the project is **Duncan King**; **Thomas E. Gaynor** is chief engineer.

The **New-Shat-Tex Corporation** which was formed by **The Texas Company**, **Shattuck-Denn Mining Company**, and **New Jersey Zinc Company**, has been changed to the **Texas Zinc Minerals Company** with the sale of **Shattuck-Denn's** interest to **The Texas Company**.

The firm has an option on the **Happy Jack** uranium mine in White Canyon district of San Juan County, Utah, and at this writing was awaiting a favorable tax ruling from the Internal Revenue Department before picking up the option.

United Park City Mines Company is driving exploratory percussion drill holes at the rate of approximately 4,000 feet per month. A heavy duty drill is exploring formations below the main drain tunnel level, and two light-weight diamond drills are used for short range work. The areas being explored are in the **Thaynes** shaft, the **Zev** shaft, the **Silver King** main shaft, the joint area between the **Silver King** and **Daly West-Judge** mines along the **Crescent** and **Daly-Judge** fault fissure systems, and in the **Park Utah** mine. The large percentage of production is being mined from the **Ontario** unit of the property.

Production at the **Radon** uranium mine near Moab, Utah is increasing steadily and is expected to reach about 5,000 tons per month by fall. The mine is owned by **Radosock Resources, Inc.**, a subsidiary of **Federal Uranium Corporation**, and is being operated by **Hecla Mining Company** of Wallace, Idaho.

Howe Sound Company reports that its cobalt refinery at Garfield, Utah is operating on a more satisfactory basis than previously. During March 220,000 pounds of cobalt were produced, and for the first quarter 518,376 pounds were produced. In the first three months of 1955, cobalt output totaled 237,152 pounds. It is now expected that there will be a gradual increase in output until the desired capacity of the plant is

attained. A pilot plant to make electrolytic cobalt has been in operation for several weeks but the work is not sufficiently advanced to evaluate the economics of the process yet.

Atlas Corporation is planning to increase its exploration work on its uranium holdings in Utah this season, and may cut production from the **Delta** mine to 2,500 tons monthly in doing this. **Delta's** output has been 5,000 tons monthly since it started producing in July 1955, under the control of the **Hidden Splendor Mining Company** (Atlas subsidiary). **Hidden Splendor** personnel and equipment will be used in the exploration work. Proven ore reserves in **Atlas's** uranium mines are said to total 370,000 tons and probable reserves 875,943 tons, based on reports of independent geologists. These reports say that **Delta** ores have an average uranium oxide content of 0.35 percent and that ores of the **Ruddock** claims (controlling interest purchased by **Atlas** last year) have an average of 0.497 percent.

Silver Dollar Mining Company of Spokane, Washington has acquired a 18-claim uranium prospect in San Juan County, Utah's White Canyon area and is planning an immediate exploration program. Drilling depths are not expected to exceed 300 feet. **Elmer E. Johnston** is president.

Drilling of the **Phoenix** group of claims in the Big Indian District of San Juan County, Utah is getting under way. It is a joint venture of **Western Silver-Lead Corporation**, **Square Deal Mining and Milling Company**, and **Uranium Mines, Inc.**, all of Wallace, Idaho.

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WYOMING

Three drilling rigs of the *Ainsworth Drilling Company* of Wichita, Kansas, are drilling on a 24-hour basis for the *O. A. Sutton Investment Company*, also of Wichita, on a large number of uranium claims leased by the firm in the Crooks Gap area of Wyoming. Present drilling is going to about 400 feet, but will get deeper in following the dip of the Wasatch sandstone. The firm is also planning to have Ainsworth, one of the leading slim-hole drilling companies in the oil industry, drill several deep check holes, perhaps as deep as 3,000 feet or more.

Nearly 2,000,000 acres of the sprawling Wind River Indian Reservation in central Wyoming were opened to uranium activity May 1. The reservation has been divided into numerous tracts, some reserved for competitive bidding at a later date, and others opened for general prospecting under strictly defined regulations. Information and application blanks may be obtained from the Superintendent, Wind River Indian Reservation, Ft. Washakie, Wyoming.

Bethlehem Steel Corporation has purchased approximately 500,000 tons of bentonite on claims in southern Johnson and northern Niobrara counties in Wyoming for an undisclosed price. The steel firm has options to purchase an additional 1,500,000 tons on other claims in

the same area. The claims purchased by Bethlehem cover nearly 2,000 acres.

Charles Steen, president of the *Utex Exploration Company*, is one of four partners interested in a block of 26 uranium claims in the Cooper Creek area to the east of Crooks Gap in central Wyoming. Several crews of Mr. Steen's *Moab Drilling Company* have started drilling operations on the claims. Associated with Mr. Steen in the property are Ed and George Snyder, officials of *Combined Metals Reduction Company*, and Don Link, an oil and uranium operator of Denver, who brought about the agreement.

Metro Minerals and Exploration, Inc. of Cheyenne, Wyoming recently made the first shipment of uranium ore from the controversial Pumpkin Buttes area.

A \$100,000 test drilling program for its uranium properties in the Gas Hills area has been announced by John D. Cummings, vice-president of *P-C Mining Corporation* of Riverton and Cheyenne, Wyoming, and Schenectady, New York. The property is adjacent to the large open-pit mine of *Two States Uranium*, one of the large producers in the area.

Reynolds Metals Company has launched a detailed study of the desirability of a site on Lake DeSmet in northern Wyoming for a \$100,000,000 aluminum reduction plant. If the company constructs the plant at the site, it would utilize nearby coal, under lease by Reynolds, as fuel for a generating plant.

Lisbon Uranium has started an extensive drilling and testing program on

some 100 claims in the Crooks Gap area of Wyoming.

J. C. Heald, of Fort Worth, Texas, who purchased a lease to a large block of uranium claims in Wyoming's Crooks Gap area, now has several drilling crews at work.

Test runs of 25-30 tons of ore per day are being made by the *Warren Oil & Uranium Company* of Fort Worth, Texas, at its tungsten milling operation at the historic *Pioneer-Carrisa* gold mine in the South Pass area of central Wyoming. The company is trucking the ore from its mines on Hoodoo Creek in the Copper Mountains northeast of Shoshoni. The milling operation is using a part of the modern flotation mill constructed at the mine in the past two years for milling gold ore.

A pilot plant for the production of commercial grade selenium is expected to start operation soon in the Poison Basin area near Baggs in southern Wyoming. It has been announced by the *Shawano Development Corporation*. The firm expects production of 1,200 to 2,000 pounds of commercial grade selenium per day from the plant. The selenium was discovered in association with uranium. With selenium now quoted at about \$13 per pound, Shawano officials say they feel construction of the plant is worth the gamble in the light of favorable reports from the U. S. Bureau of Mines experiment station in Salt Lake City. The claims are under operation of *St. Michaels College Foundation, Inc.* of Santa Fe, New Mexico, which provides funds to the Catholic college.

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Anaconda Investigating Two New Butte Projects

Two new projects that might possibly involve the development of a second open pit and another major shaft installation in relatively unprospected areas of Butte, Montana are being investigated by The Anaconda Company. Exploration work now underway in an alluvial covered area east of the present Leonard, Tramway, Pennsylvania, and Belmont shafts, and drilling in the vicinity of Continental Fault near the old Butte-Duluth and Bullwhacker pits, may make development of these areas economically attractive in the future. Known as the East Project and the Continental Project, they are in addition to the recently announced plans of Anaconda to step up production at the Berkeley open pit and the Northwest Project to further expand vein mining in fringe areas of the west part of the Butte hill. The Continental Project might require the construction of a new mill in the foothills east of Butte.

Geologic conditions favorable to ore occurrences are known to exist in the east section of the Butte district and underground development for that portion of the work known as the East Project is being conducted from the Leonard 3300 and 3400 levels and the Belmont 3,000 level. This area is overlain with some 500 feet of gravel and sand wash. A decision to re-open one of the old Pittsmond shafts will provide access to workings on upper levels from which development work will make it possible to determine the most advisable location for the East Project shaft. A large capacity hoisting installation would be required should the company decide to proceed with plans for the East Project.

The Continental Project is located in the foothills east of the alluvial wash section encompassed by the East Project. Stringers and mineralized granite containing copper sulphide specks, principally of chalcopryite, and the oxidation products, malachite, azurite, and carbonates of copper, along with chrysocolla and cuprite, occur in irregular, scattered masses. The minerals are found from the surface to a depth of 100 to 400 feet. This mineralization is quite different from that found at the Berkeley open pit where secondary enrichment products are the principal minerals. The Continental type mineralization would require flotation and leaching facilities to recover copper values. If present drilling discloses sufficient ore reserves of economic grade, a mill may be constructed near the Continental Project and the sulphide concentrate shipped to Anaconda for smelting. Copper sulphate resulting from leaching Continental ores could be precipitated in the present or enlarged precipitation plant east of Meaderville.



IDAHO

Polaris Mining Company is planning 2,000 feet of additional exploration drift on the 2500 and 3200 levels in the 59 percent-owned Purim area of the Silver Belt west of Wallace, Shoshone County, Idaho. It is developing new ore bodies on the 2,500-foot level in its adjoining Silver Summit mine and in the adjoining

Chester area at the 3000 level. L. J. Randall, Wallace, is president.

Hecla Mining Company's new Silver Mountain shaft east of Mullan, Shoshone County, Idaho, had reached a depth of about 750 feet at last report. It is scheduled for completion by year's end. About 6,000 feet of drifting will then be carried out on the Idaho Silver vein. Bunker Hill Company has a half interest in the project.

Sidney Mining Company is nearing its vein objective on the new 2300 level of its zinc-lead mine near Kellogg, Shoshone County, Idaho. The structure, about 800 feet from the shaft, will be explored for the full length of the property and extended into adjoining ground of Nevada-Stewart Mining Company under an operating agreement. Malcolm C. Brown of Kellogg is president.

Nabob Silver-Lead Company is starting to sink a two-compartment incline shaft on a lead-zinc ore body exposed on the main haulage level of its mine near Kellogg, Shoshone County, Idaho. C. C. Dunkle, vice president, is in charge.

Golconda Lead Mines is mining about 30 tons of ore daily from rehabilitated old workings on the 1600 level of its property east of Wallace, Shoshone County, Idaho. Exploration also is being carried on. Wray Featherstone of Wallace is manager.

The Lucky Friday Silver-Lead Mines' shaft east of Mullan, Shoshone County, Idaho will be deepened 700 feet from the present bottom 2400 level. Exploration of adjoining Gold Hunter ground leased from Day Mines, Inc., also is programmed. Production is about 150 tons daily. Charles E. Horning of Wallace is president.

A milling unit utilizing magnetic refining has been ordered by Salmon River Scheelite Corporation for installation at its Custer County, Idaho tungsten property. The unit is manufactured by Black Machine Shops, Bishop, Calif. Capacity is about 25 tons of ore daily. The firm also is planning to erect a small refinery plant at Salmon. Four men worked at the mine throughout the winter and ore reserves are estimated at about 40,000 tons. Harvey Penney, Salt Lake City, is president; James E. Clutis, secretary-treasurer-manager.

At the Sunshine mine, Shoshone County, Idaho, Sunshine Mining Company is exploring what is believed to be a newly discovered silver vein. First found on the 3,850-foot level in the foot-wall side of the main Sunshine vein zone, it has been intersected in a drill hole on the bottom 4000 level. The company has developed a new process for upgrading cathode antimony at its antimony leaching plant to 99.95 percent purity.

Two feet of high-grade silver-lead-zinc mineralization and a like amount of good grade mineralization have been opened in a winze being put down at the old Queen of the Hills property in the Mineral Hill district of Blaine County, Idaho. R. T. Fitz is general manager of the operating Silver Star-Queens Mines, Inc.

Bradley Mining Company is dismantling and selling its crushing plant and flotation mill at Stibnite, Idaho. Both have been used in antimony operations in recent years, and, in earlier days, were used to process gold ore.

Idaho Goldfields, Inc. has contracted with Johnson Brothers of Metaline Falls,

Washington to extend an incline shaft on a lead-silver-gold vein at its Fourth of July Canyon property east of Coeur d'Alene, Kootenai County, Idaho. Development ore is being stockpiled for concentration in a small Brickley mill nearing completion. L. A. Thompson of Spokane is president.

Benewah Mines, Inc. of Plummer, Idaho has been incorporated for \$50,000 to seek uranium and other metals. First work is planned on a 4,000-acre lease block in Wyoming's Riverton district. J. R. Inscore, is president.


Uranium Exploration Corporation of Idaho at Twin Falls, Idaho is planning to use jeeps and pack horses to prospect its Custer and Blaine County holdings this summer. Twenty claims have been added to the firm's Rock Creek property in Blaine County, and it has leased an additional 30 claims adjoining its 7-claim group on the North Fork of Lost River in Custer County. Bert A. Sweet is president and Leonard Mauss, secretary-treasurer.

John R. Goggins and C. F. Nechanicky, Salmon, and I. J. White, Bismarck, S.D., have incorporated Allison Creek Mining Company of Salmon for \$50,000.

Metropolitan Mines Corporation is stockpiling development ore from two faces in the old Black Bear mine near Gem, Shoshone County, Idaho, which it has reopened. An easterly drift on the 200-foot level opened a four-foot width of lead milling ore. Arrangements have been made to process the ore in the nearby Hull Lease mill. The property is being operated under an agreement with Black Bear Silver Lead Mines.

The Radiore Mining and Exploration Company recently filed for incorporation in Boise, Idaho. Directors of the firm are Earl Murray, James Howton, and Don Maughan, all of Milton-Freewater, Oregon.

Hall Mountain Thorite Company is planning additional bulldozing along a vein outcrop on its five-claim property near Porthill, Boundary County, Idaho. Good values in thorium oxide, some uranium oxide, and zirconium were exposed by bulldozer work after the claims were staked last year. B. R. Berringer, Spokane, is president and manager.



MONTANA

Minerals Engineering Company reports that preliminary drilling on an iron ore deposit near its tungsten holdings at Glen, Montana indicated an estimated 42,000,000 tons of iron ore. The deposit is said to be 12,000 feet long and 900 feet wide. Depth is not known. Preliminary tests have also shown that the iron can be magnetically concentrated to produce a 60 to 65 percent iron concentrate with less than 5 percent silica.

Clay Lewis and E. T. Vincent plan to start placer operations on Quartz Creek in Mineral County, Montana in the near future. The two men operate a dragline, dry-land dredge combination to recover placer gold.

Donald Frankel of Los Angeles and associates are developing the Mooney uranium mine west of Butte in the Price Gulch district of Montana.



The *Uranic and Strategic Minerals, Company, Inc.* of Boise, Idaho is reported to be drilling a cinnabar prospect on Vale Butte, Malheur County, Oregon. On Bull Creek, also in Malheur County, H. K. Riddle is continuing underground exploration work on cinnabar claims owned by the Jordan brothers.

United Pacific Mining Corporation has been organized with headquarters in Eugene, Oregon by George T. Langford, Roy C. Barr, Mel Gans, Peter Don Reich, Avery Armstrong, and Charles G. Williams. Mr. Barr, president of the new firm, says the group will be interested primarily in uranium, mercury, and copper.

WASHINGTON

Sidney Mining Company, Kellogg, Idaho, has started examination and exploration of 1,400 acres of ground in the Mount Spokane uranium district under an operating agreement with *Carbon Mining and Uranium Company*, Spokane. At last report, it was preparing to drill claims in Stevens County, Washington, north of the Spokane Indian Reservation, under an operating agreement with *Indian Chief Uranium Company*. Malcolm Brown of Kellogg is Sidney president.

Daybreak Uranium, Inc., has shipped five cars of uraninite ore from its *Lowley* lease on the Spokane Indian Reservation in Washington. This makes it the first operator in the Spokane area with two producing uranium mines. At last report, it had shipped nearly 100 cars of autunite ore from its No. 1 open-pit mine in the Mount Spokane district. It has shipping contracts with *Vitro Uranium Corporation*, Salt Lake City.

Five out of seven holes drilled by *Northwest Uranium Mines, Inc.*, on the Spokane Indian Reservation in southwestern Stevens County, Washington, showed good ore widths. Radiometric probes by the U.S. Atomic Energy Commission personnel indicated a bedded deposit of commercial grade ore 16 to 27 feet thick and a fault zone containing 12 to 15 feet of ore. Preliminary estimates by company officials fix the tonnage at 60,000 to 70,000 tons. The ore body lies less than 30 feet beneath the surface. Northwest Uranium is the operating company for *Silver Buckle*, *Eastern Lead*, and *Fortune* mining companies of Wallace, Idaho, *Stansbury & Associates*, Spokane, and *Pathfinder Uranium Corporation*, Salt Lake City.

A \$180,000 exploration and development program has been laid out by *North Star Uranium, Inc.*, a new Spokane firm which has extensive holdings in Spokane, Stevens, and Pend Oreille counties, Washington. Overburden in the Mount Spokane district is being tested with a truck-mounted auger drill designed for digging holes for power line poles.

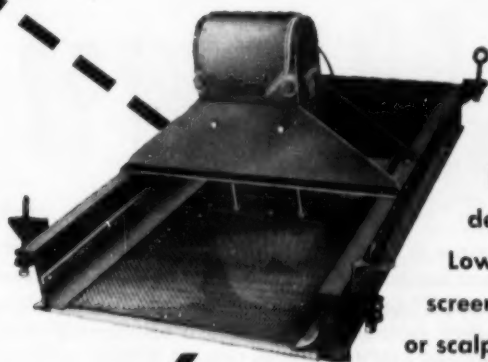
Several hundred tons of possibly commercial grade autunite and curite ore has been exposed at claims acquired by the firm on Lamb Creek in northern Pend Oreille County. William F. Wuest, Calgary geologist, and Sam H. Richardson, mining engineer, are directing work. Ron C. McKelvie, Spokane, formerly of Calgary, is president.

American Leduc Uranium Corporation, subsidiary of *American Leduc Petroleum, Ltd.*, Edmonton, Canada, found autunite mineralization in the first two holes it drilled in the Mount Spokane district of Washington. Blank lamp examination of cuttings indicated 32 feet of mineralization in one hole and 12 feet in the other. The discoveries were made

at depths of 40 feet on a 320-acre lease adjoining the producing *Daybreak* autunite open-pit mine on the west. The work is being directed by Harold R. Smith, geologist in charge of the firm's northern operations.

Autunite also has been found just west of the American Leduc discovery on a state lease acquired by Al Herem and John Moore of Miles City, Montana. It has been discovered in two of four shallow drill holes and in a bulldozer cut beneath a layer of blue clay. *Frontier Exploration Company* of Great Falls, Montana did the "cat" work and drilling. Harry Spencer, Great Falls, is president. Oscar Herem, Miles City, is in charge of work.

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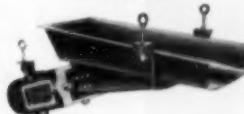
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Hecla Mining Company, Wallace, Idaho, is exploring two 80-acre leases in the Mount Spokane, uranium district under an operating agreement with **Greenbluff Uranium Co., Inc.** of Rockford, Washington. It is Hecla's first venture into uranium outside of Utah, where it is mining the **Radon** deposit near Moab for **Federal Uranium Corporation**. L. J. Randall is president.

Crystal City Mining Company is planning to drive a raise on high-grade lead-silver ore found in unwatering an old 181-foot shaft at the company's property near Miles, northern Lincoln County, Washington. The ore was found in a 25-foot tunnel leading from the shaft at a depth of 130 feet. Luke C. Williams of Spokane is president.

Big Smoke Uranium, Inc., has made its initial shipment to **Vitro Uranium Corporation** at Salt Lake City—two cars of uraninite ore from the Spokane Indian Reservation. William O. Kumbra of Spokane, Washington is president.

Black Falcon Mining Company has purchased a new air compressor for use in drilling prospect holes with a jackhammer on its uranium prospect in the Mount Spokane district, northern Spokane County, Washington. Dr. W. C. Miner, Spokane, is president.

Senco Mining Company of Spokane has been organized to explore and develop uranium properties in northeastern Washington. Capitalization is \$50,000 and incorporators are Verne Scherer, Chehalis; W. L. Rembold and O. L.

Nichols, Centralia, and Julian C. Rice, Spokane.

Kromona Mines Corporation is preparing to resume production at its copper property in Snohomish County, Washington. Development work is expected to add appreciably to ore reserves which, at last report, were listed at 50,000 tons of developed ore. In 1955 the firm spent more than \$100,000 on development work and in repair of snow-damaged buildings and machinery. It produced 100 tons of concentrates.

W. A. Nations of Republic, Ferry County, Washington, is making a survey of mine owners and prospectors in his area to determine quantity and type of ore which would be available for a proposed custom mill to treat base metals.

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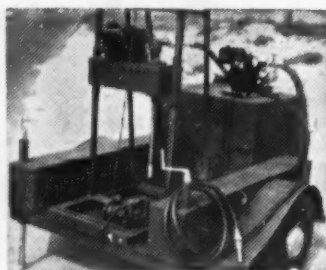
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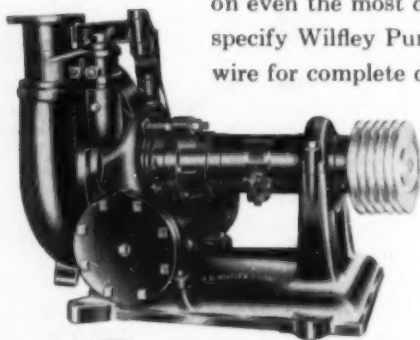
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